...CHNOLOGY DEPT.

INDIA RUBBER WORLD

OUR

63rd YEAR

A BILL BROTHERS PUBLICATION

AUGUST, 1952

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GODFREY L. CABOT, INC.
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You can improve processing of OIL-ENRICHED GR-S with Du Pont RPA No. 3

Manufacturers now using Du Pont RPA No. 3 to peptize oil-enriched GR-S report that it:

✓ Reduces nerve.

✓ Shortens breakdown time.

✓ Makes processing easier.

IF YOU ARE HAVING TROUBLE breaking down oil-enriched GR-S satisfactorily, it will pay you to investigate Du Pont RPA No. 3.

This highly effective peptizing agent reduces the characteristic nerve which ordinarily makes these stocks hard to handle. Breakdown time is materially shortened. Fillers and compounding agents are added more easily.

Du Pont RPA No. 3 has proved particularly effective in GR-S—1700, the high-conversion, oil-extended polymer. Addition of 0.5 to 1.0 part helps to form a smooth band rapidly. Stocks won't swell at the tuber.

You'll find complete information on the use of RPA No. 3 in both GR-S and natural rubber in our Report No. 50-5. Ask your Du Pont representative for a copy of the report and a sample quantity of RPA No. 3.

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150th Anniversary

BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

INDIA RUBBER WORLD, August, 1952, Vol. 126, No. 5. Published Monthly by BILL BROTHERS PUBLISHING CORP. Office of Publication, Orange, Conn., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Orange, Conn., under the act of March 3, 1879. Subscription United States and Mexico, $5.00 per year. Canada $6.00; All Other Countries $7.00; Single Copies 50 Cents. Address Mail to N.Y. Office.

Another new development using

B. F. Goodrich Chemical *raw materials*

Pressure booster needs exceptional seal—
Hycar's the answer

THESE fluid pressure boosters develop output pressures up to 10,000 p.s.i.—must have an absolutely leak-proof seal. More than that, the seal material must not change in volume or deteriorate in hydraulic oil . . . be affected by normal operating temperature . . . or distort or cold flow under extreme pressure. On every count, the seal manufacturer found Hycar rubber fills the bill perfectly!

Meeting unusual requirements like these is an every-day job for Hycar. For this versatile material can be made resistant to heat and cold . . . abrasion . . . oil, grease, gas, many chemicals and more rugged service conditions.

Perhaps one of the many Hycar rubber compounds can help you improve or develop a product—or solve troublesome, costly problems. Write for helpful technical bulletins and advice. Please address Dept. HB-4, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
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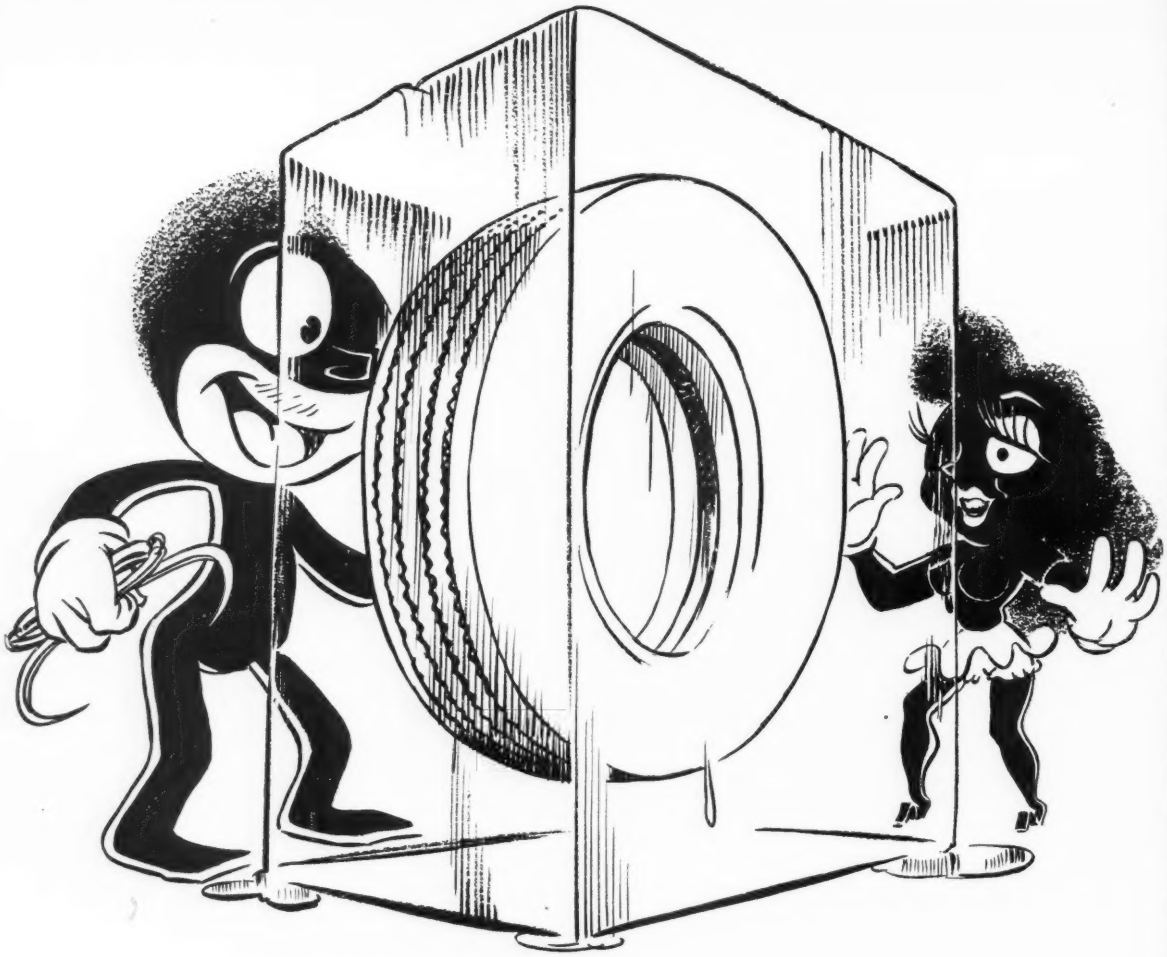
Hycar
Reg. U.S. Pat. Off.
American Rubber

This seal made for Miller Motor Co., Chicago, Ill., by Acadia Synthetic Products, Chicago. B. F. Goodrich Chemical Company supplies Hycar rubber only.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors



Tire makers know a trick that's neat
Use **Philblack*** **A** *to disperse heat!*

● Got a temperature problem? Keep cool! Philblack A helps tire manufacturers keep their blood pressure down by dispersing heat in heavy duty tires . . . by helping to prevent dangerous heat buildup.

Other advantages: easy processing . . . smooth, fast tubing . . . good physical characteristics . . . low cost! Philblack A is being used with outstanding success in carcass stocks for heavy duty tires, in inner tubes and in many other kinds of mechanical rubber goods.

The Philblack Sales Service Laboratory, in downtown Akron, is staffed and equipped to analyze your compounding needs. Avail yourself of this service through the Philblack technical sales representative who calls on you.

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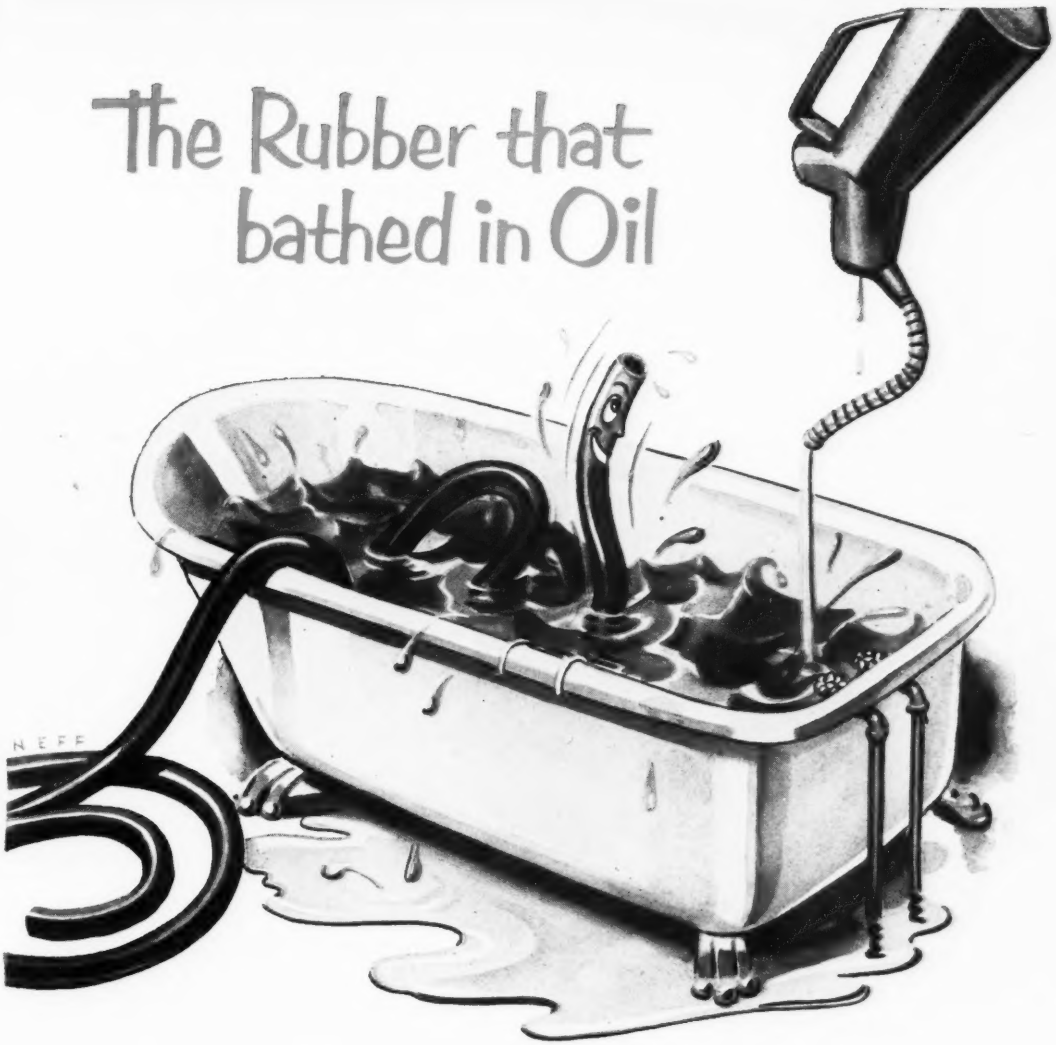
Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton.
West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

The Rubber that bathed in Oil



and loved it!

Yes, oil and rubber really do mix! That is, if the rubber is **Paracril**®, the special chemical rubber this hose is made of. It really "gets along" with even the most destructive petroleum products!

And tough **Paracril** combines this exceptional oil resistance with—unusual low-temperature flexibility—good heat resistance—high tensile strength—and rubbery resilience.

Paracril is an exceptionally easy processing nitrile type rubber. And it can be combined with other rubbers and many plastics to give them special desirable properties.

Three general grades of **Paracril,** A, B, and C, provide three ranges of oil resistance—moderate, good, and excellent—to meet your particular requirements. Modifications of each general grade are available for special applications.

Free samples are available for development studies. Send the coupon today for samples and full technical data.

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Division of United States Rubber Company

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Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

Rubber customers bouncing away?

"Alamask" odorants neutralize unpleasant odors . . . help give you rubber products that sell!

More and more people are buying products using foam and sponge rubber—pillows, mattresses, cushions, rugs, shoes. But they're getting something they don't want if they discover the foam or sponge rubber has stored up musty, unpleasant odors.

It's an easy problem to solve, however, for "Alamask" odorants will completely neutralize unwanted off-odors . . . will give your foam and sponge rubber the chance to sell.

Latex manufacturers: Easy-to-use "Alamask" odorants are now available in water dispersible form . . . require no emulsification prior to use.

To find out what "Alamask" odorants can do for you, send for your copy of the booklet "Du Pont 'Alamask' Odorants for the Rubber Industry." Write E. I. du Pont de Nemours & Co. (Inc.), Room 8452 Nemours Bldg., Wilmington 98, Delaware.

District offices: Atlanta, Boston, Charlotte, Chicago, New York, Philadelphia, Providence, San Francisco.

Du Pont **Alamask** Odorants

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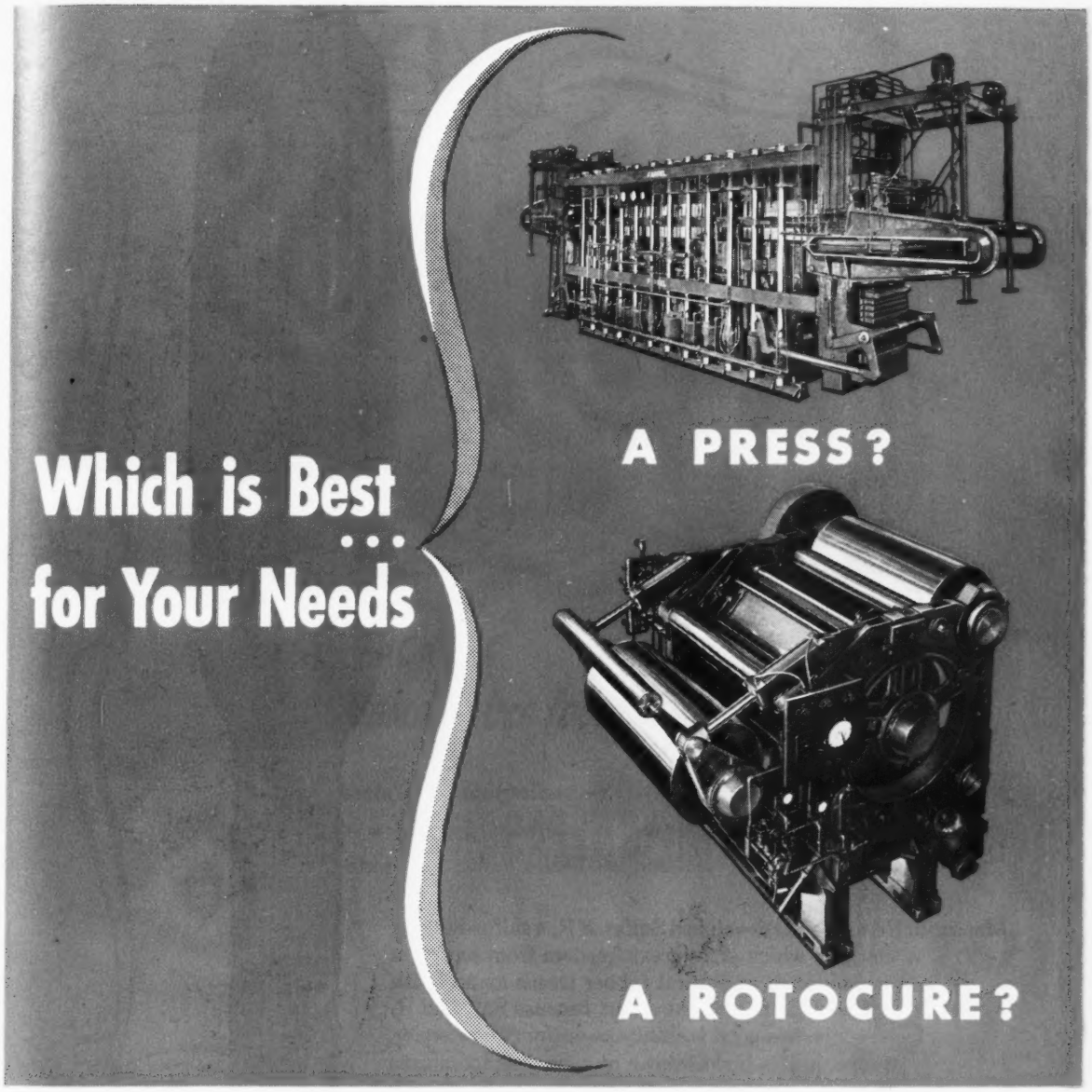

The answer to the question of which one you should use, a hydraulic press or a Rotocure, really depends on your production requirements. Each has its advantages.

We have built innumerable presses for curing conveyor and transmission belting and other products, and with the advent of the Rotocure have built a number of these machines for materials which lend themselves to continuous, long-run production curing.

Since we manufacture both hydraulic presses and Rotocures, we can furnish you whichever machine will best meet your requirements.

Farrel engineers will be glad to discuss your problems with you, without obligation.

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Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

FB-749

Farrel-Birmingham®

reduce scorch with SULFASAN R

Monsanto Research has developed Sulfasan R, a sulfur-bearing material which gives great freedom from scorch in compounds such as natural rubber treads loaded with HAF blacks. This is brought about because Sulfasan R, which has good stability at ordinary processing temperatures, breaks down at curing temperatures and liberates sulfur for vulcanization.

Some regular sulfur can be used with Sulfasan R and still maintain freedom from scorch, except under extremely severe processing conditions. Stocks containing Sulfasan R age well. White stocks in which Sulfasan R is used are not discolored.

For further information on Sulfasan R, write or phone MONSANTO CHEMICAL COMPANY. Rubber Chemical Sales, 920 Brown Street, Akron 11, Ohio.

Sulfasan: Reg. U. S. Pat. Off.

A NEW EDITION *of "Monsanto Chemicals for the Rubber Industry" is ready for distribution. If you have not received your copy, write for it. It will be sent without cost or obligation to you.*

SULFASAN R

(4,4'-Dithiodimorpholine)

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CHEMICALS — PLASTICS

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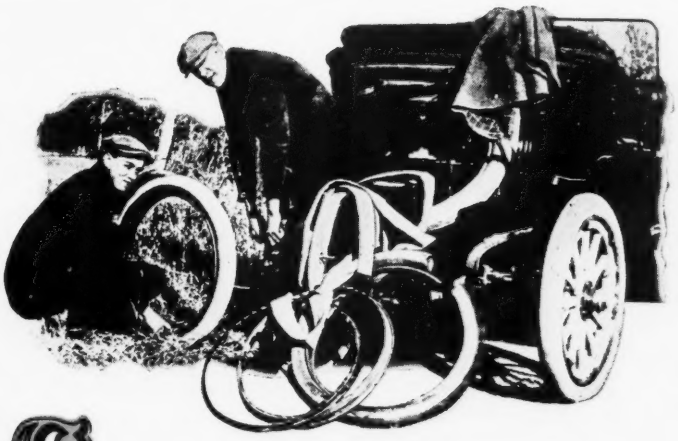

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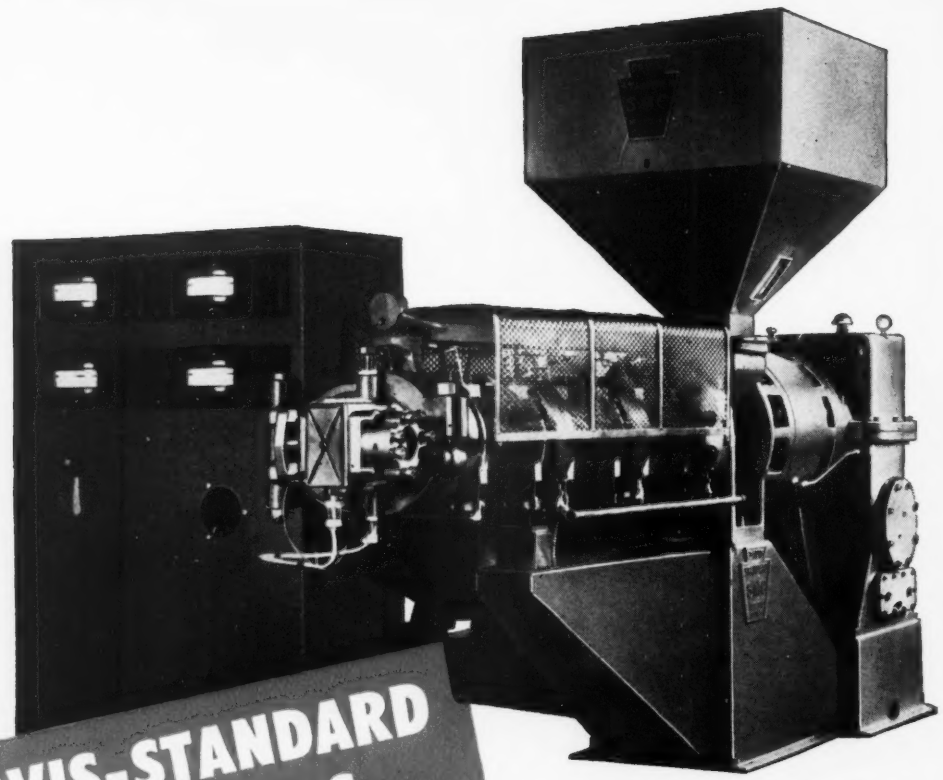

Davis-Standard 6"
Thermoplastic Extruder

DAVIS-STANDARD EXTRUDERS

...ENGINEERED TO YOUR OPERATING NEEDS

Every feature of our extruders for rubber or plastics is the result of long experience in the extrusion industries and intimate knowledge of production problems.

Davis-Standard "Stream-Flo" insulating heads permit the most efficient operating velocities. All head equipment is compact, accessible and easy to clean. For thermoplastic applications, sectional-type cast steel cylinders afford precise temperature control as well as maintenance advantages. Each section has wear and corrosion-resistant liners.

Another exclusive feature of Davis-Standard plastic extruders is the "Therma-Fin"* heating jacket, with range-type tubular heating elements and stainless steel cooling coils cast into aluminum cooling fins.

*Patent Pending

With this construction any desired temperature condition may be obtained.

Feed section is a separate casting. Stock screws are of special steel alloy, normally bored for water cooling. Variations for depth and lead are available for different compounds. Drive is V-belt or flexible coupling to enclosed worm reduction gear. Davis-Standard machines are furnished complete, including control panel, ready for installation.

Our engineers will welcome the opportunity to work with your engineers on your problems. Our extensive experience in custom-built equipment will fit the installation to your exact requirements.

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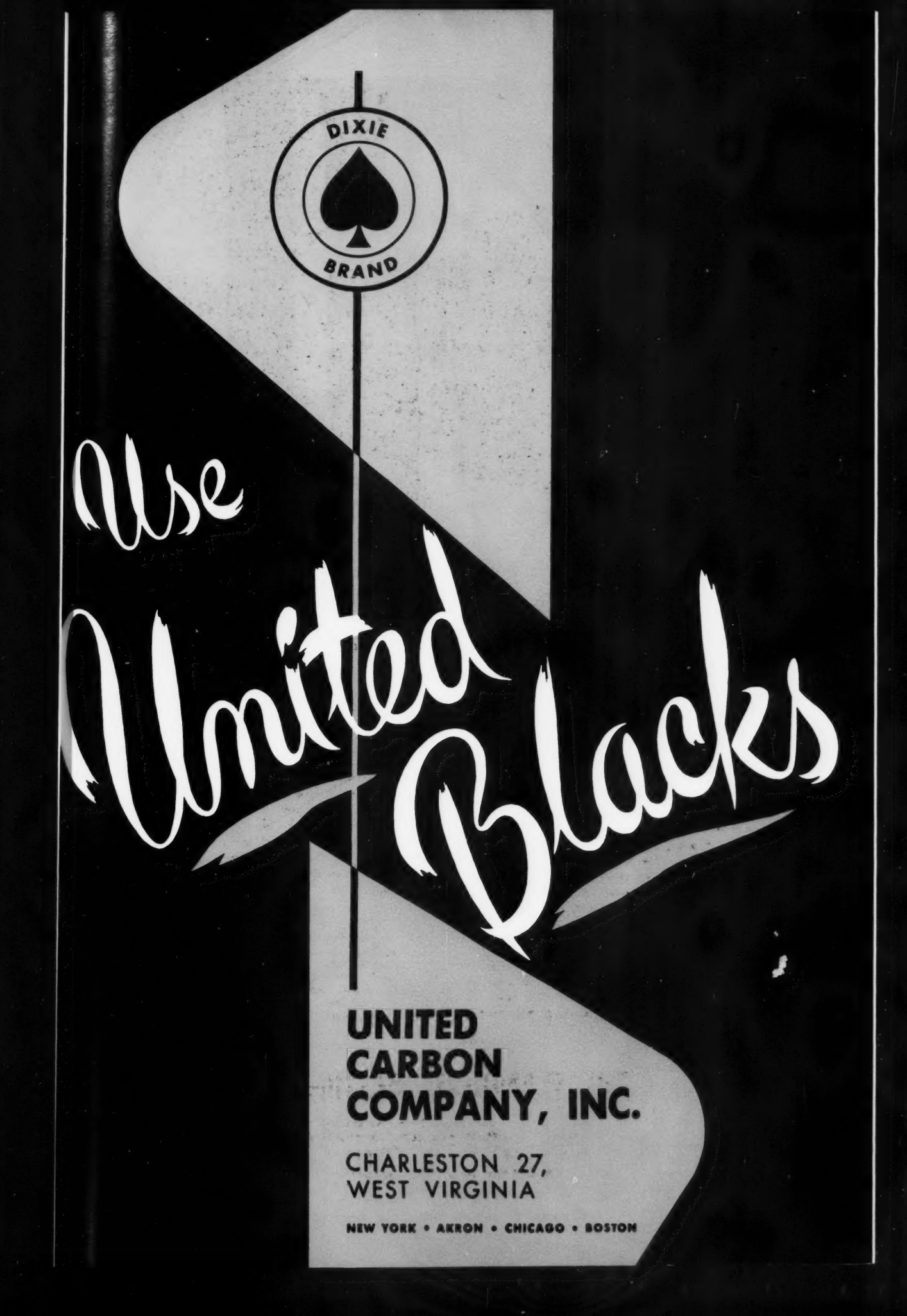
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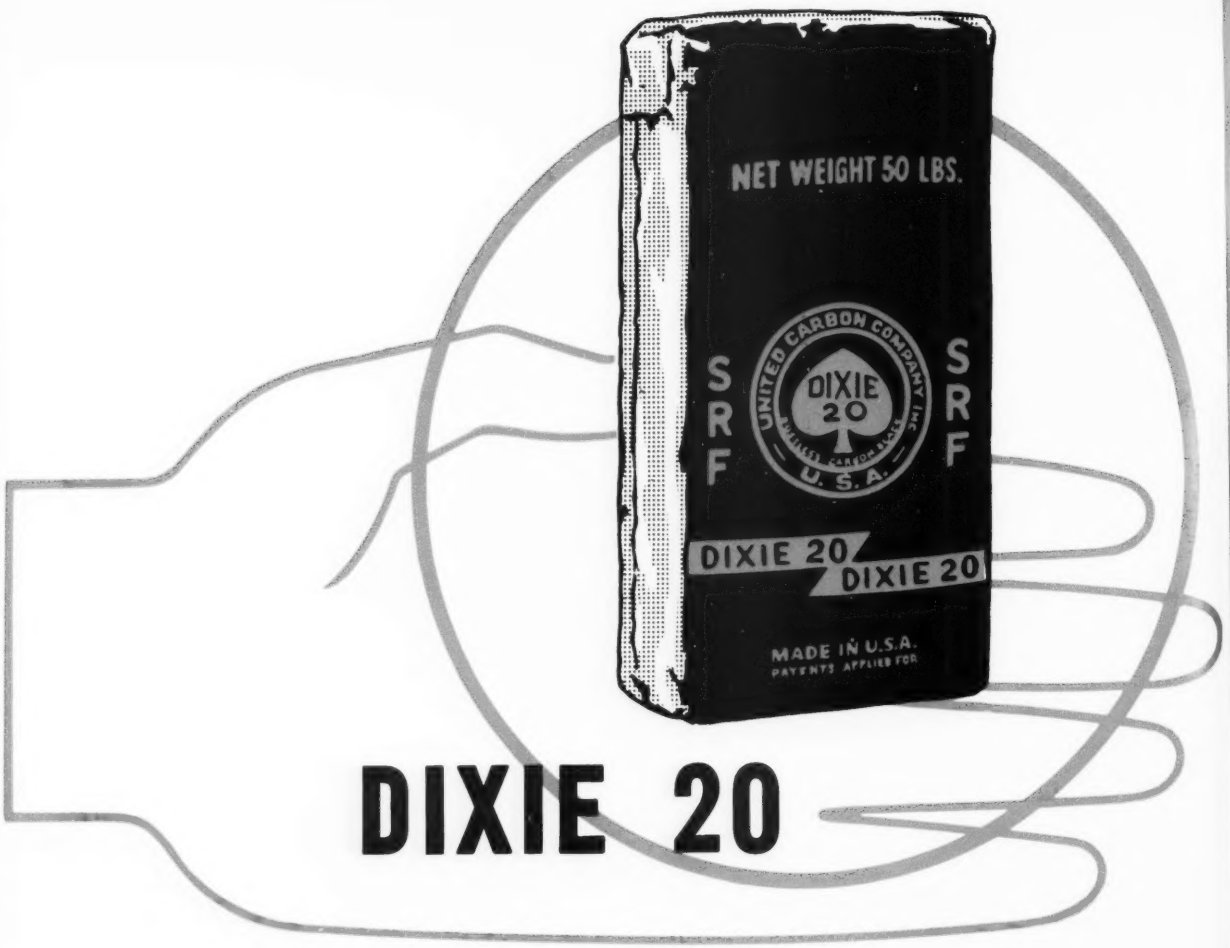

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the qualities you need!

It is easier to stay in the lead when you standardize on United Blacks. For example, DIXIE 20 . . . an SRF black with extensive applications in the rubber industry. It is a black of dependable uniformity, outstanding for ease of processing, good plasticity and fast rate of cure. For maximum efficiency use DIXIE 20.

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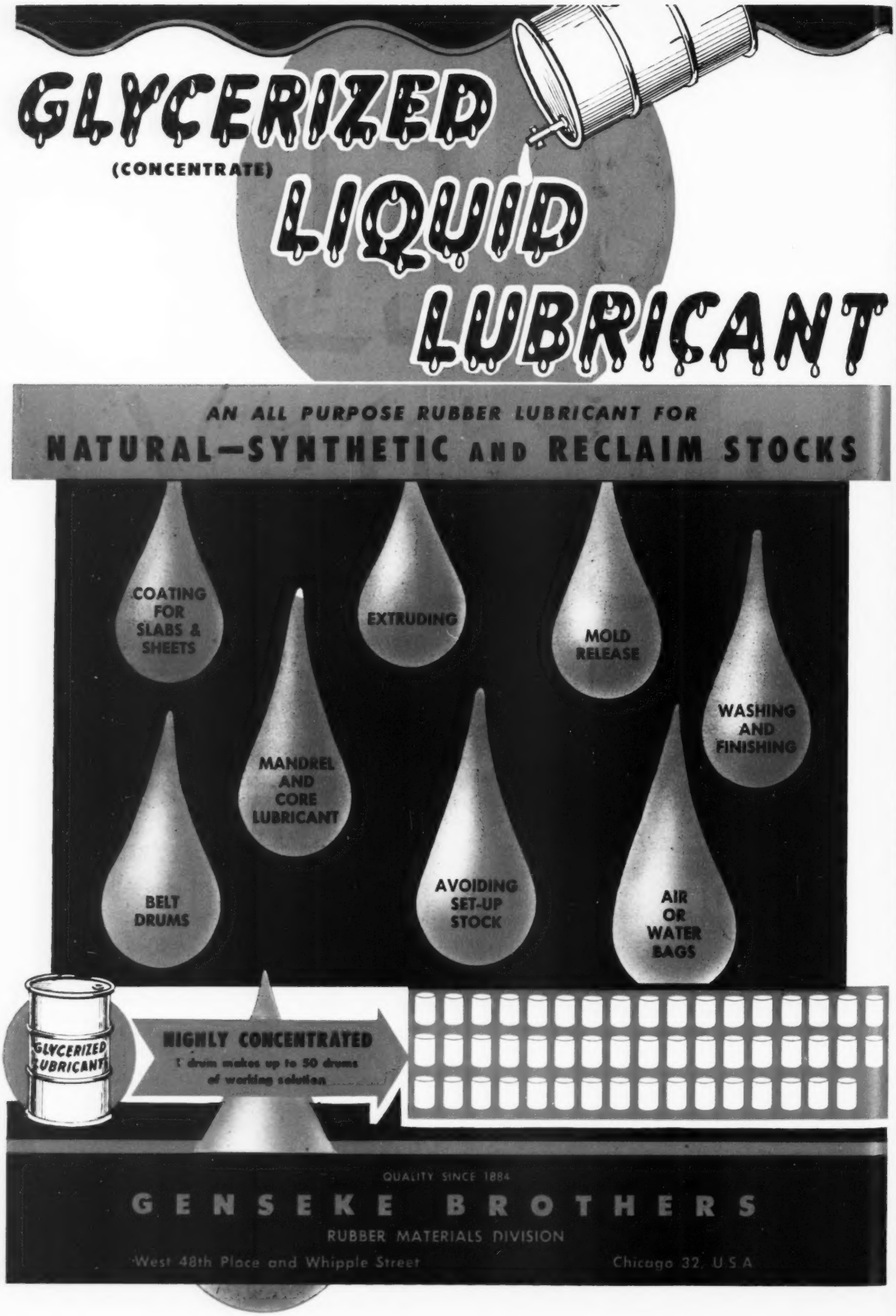
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Every tire manufacturer recognizes those two demons HEAT and OZONE and knows how harmful they can be to his products.

If these two bugaboos are plaguing you, here's a tip that may solve your problems once and for all. Many of our customers have found that three of our reclaims impart characteristics to sidewalls that make them a lot less susceptible to the ravages of heat and ozone. U. S. Reclaims #R-351, #2017 and #2026, used in sufficient quantities in your compounds, will add the right kind of RESISTANCE to these two terrors and still give you the compounding and processing economies you have learned to expect from U. S. Reclaims.

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Always keep reclaims in your formula and always look to U. S. for the best. U. S. Rubber Reclaiming Company, Inc., P. O. Box 365, Buffalo 5, N. Y. Trenton agent: H. M. Royal, Inc., 689 Pennington Avenue, Trenton, N. J.

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for this triple protection

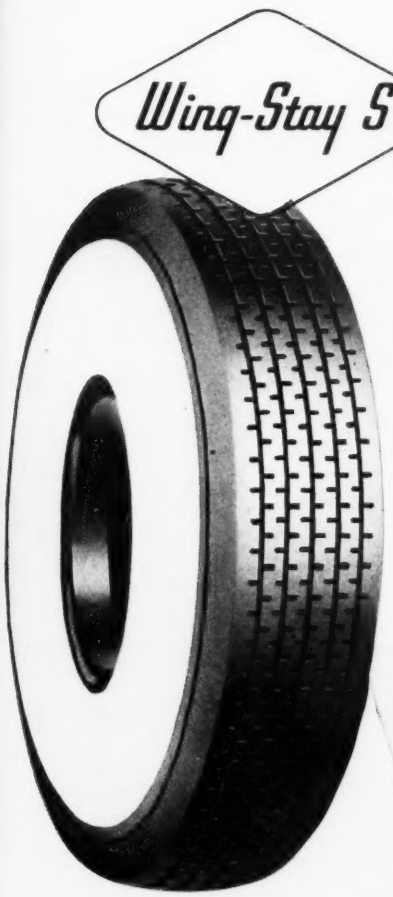
ANYTHING made of rubber needs protection against oxidation, sunlight, aging, and excessive heat. White and light-colored products particularly need protection.

Choice of the rubber industry to protect these items is WING-STAY S produced by Goodyear's Chemical Division. For WING-STAY S keeps colors clean-looking, will not migrate to the surface or into adjoining products, is non-staining and gives positive protection.

Since August 1951, more nonstaining synthetic rubber, including GRS-1006 and GRS-1502, has been made with WING-STAY S than with all other anti-oxidants combined.

By using WING-STAY S, you will secure the best possible balance—in natural or synthetic rubber—between preservative properties, nondiscoloring and nonstaining properties and low cost. For details, write,

Goodyear, Chemical Division, Akron 16, Ohio

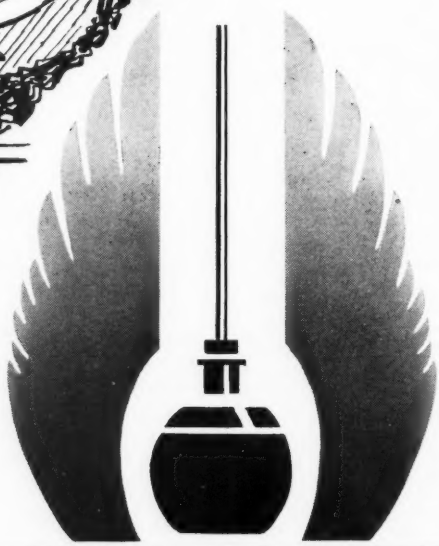


Chemigum, Pliobond, Pliolite, Pliovic, Wing-Stay–T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

want to soften up a tough opponent?

Plasticize GR-S with PARA FLUX®



Standard of the Rubber Industry for 28 years

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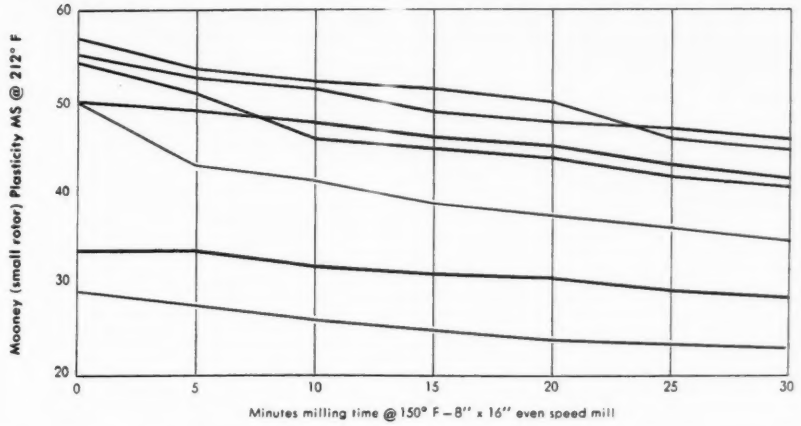
CHEMICAL MANUFACTURERS

MILL BREAKDOWN—CHEMIGUM VS. NITRILE RUBBERS



NITRILE RUBBER	Parts Acrylonitrile
Rubber E	45
Rubber D	30
Rubber C	45
Rubber B easy processing	30
CHEMIGUM N3	45
Rubber A	26
CHEMIGUM N4	30

Here's Proof—

THE EASIEST PROCESSING NITRILE YOU CAN BUY IS CHEMIGUM

POUND for pound of acrylonitrile content, no other nitrile rubber is easier to process on the mill or in the banbury than CHEMIGUM! The chart you see here shows that Goodyear's use-proved CHEMIGUM gives you easier process on a hot mill —softening gradually with prolonged mastication rather than toughening.

And this easier processing is obtained without loss of physical or chemical properties — compression set, water absorption and brittle point are low, while oil and solvent resistance, tensile strength, elongation, modulus and crescent tear are all characteristically high.

In either light or dark products—wherever oil or solvent resistance is a requirement—it will pay you to use CHEMIGUM. Ask a Goodyear Chemical Division Representative for details, or write:

Goodyear Chemical Division, Akron 16, Ohio

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Chemigum, Pliobond, Pliolite, Pliovic –T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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Announcing

FINEST PARTICLE SIZE ZINC OXIDE SURFACE-TREATED WITH PROPIONIC ACID

PROTOX*-169

First Zinc Oxide To Combine These 3 Advantages:

1. **LARGEST SURFACE AREA**

Protox-169, prepared by surface-treating Kadox-15 with propionic acid, provides a surface area of about 10 square meters per gram. Other zinc oxides range in surface area from 3.5 to 8 square meters per gram.

2. **FAST PROCESSING**

Protox-169 has the unique coating of zinc propionate that is readily wetted by both natural and synthetic rubber. This coating imparts fast incorporation, smooth tubing and calendering.

3. **EXCELLENT DISPERSION**

Protox-169 provides the outstanding dispersion characteristics of the other Protox brands, giving maximum efficiency of activation and reinforcement.

To check these advantages of Protox-169 in your compounds, we shall be glad to send you samples.

*U. S. Patents, 2,303,329 and 2,303,330.

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Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

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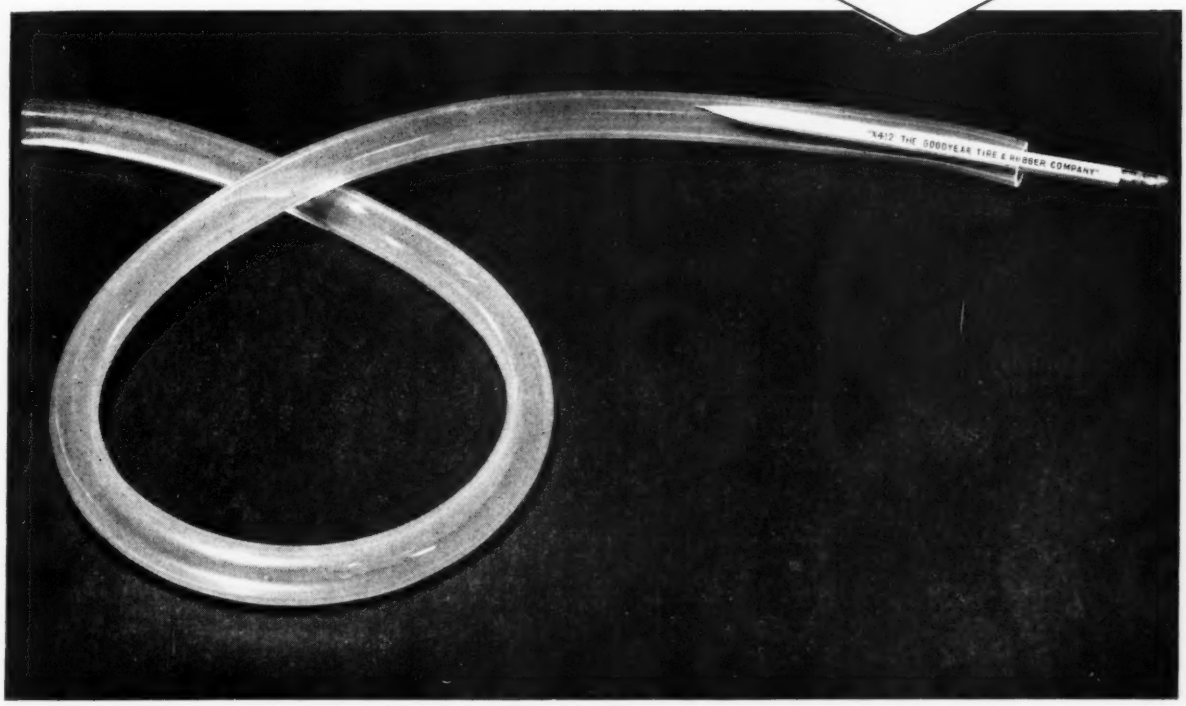
—YOU'LL DO BETTER WITH PLIOVIC



Outstanding clarity and flexibility mark this extruded vinyl hose made with PLIOVIC—*Goodyear's use-proved vinyl resin.*

EVEN in extruded hose or tubing, you can get clarity without loss of strength, flexibility or gloss when you use one of the new PLIOVIC resins. And you can extrude directly from the pre-mix with this use-proved Goodyear vinyl resin—eliminating time-wasting mill mixing. Whatever your manufacturing method may be, you can use PLIOVIC—and process more easily at lower temperatures.

Rigid or pliable, clear or opaque, PLIOVIC products have outstanding chemical resistance, heat and light stability and excellent physical properties. So look to PLIOVIC for new applications using vinyl resins and latices.

For details and samples, see a Goodyear Chemical Division Representative, or write:

Goodyear, Chemical Division, Akron 16, Ohio

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PERMANENT BONDING QUALITIES...
EXTENDED 'TACK LIFE'...

'TUF-GRIP' is tops for extra strong bonding.
'TUF-GRIP' is available with short or long periods of "tack life."
'TUF-GRIP' is available in clear or colors inlcuding black and white.
'TUF-GRIP' is thoroughly dependable ..and it's tough!

IT'S WIDELY ADAPTABLE...
Adheres well to cellulose... wood... rubber ...leather... cloth... cork and synthetic rubber surfaces.

'TUF-GRIP'
by HADLEY'S
a new, proved line of
SOLVENT TYPE CEMENTS
FOR MACHINE OR BRUSH APPLICATIONS

SINCE 1919 *Send Us Your Adhesion Problems*

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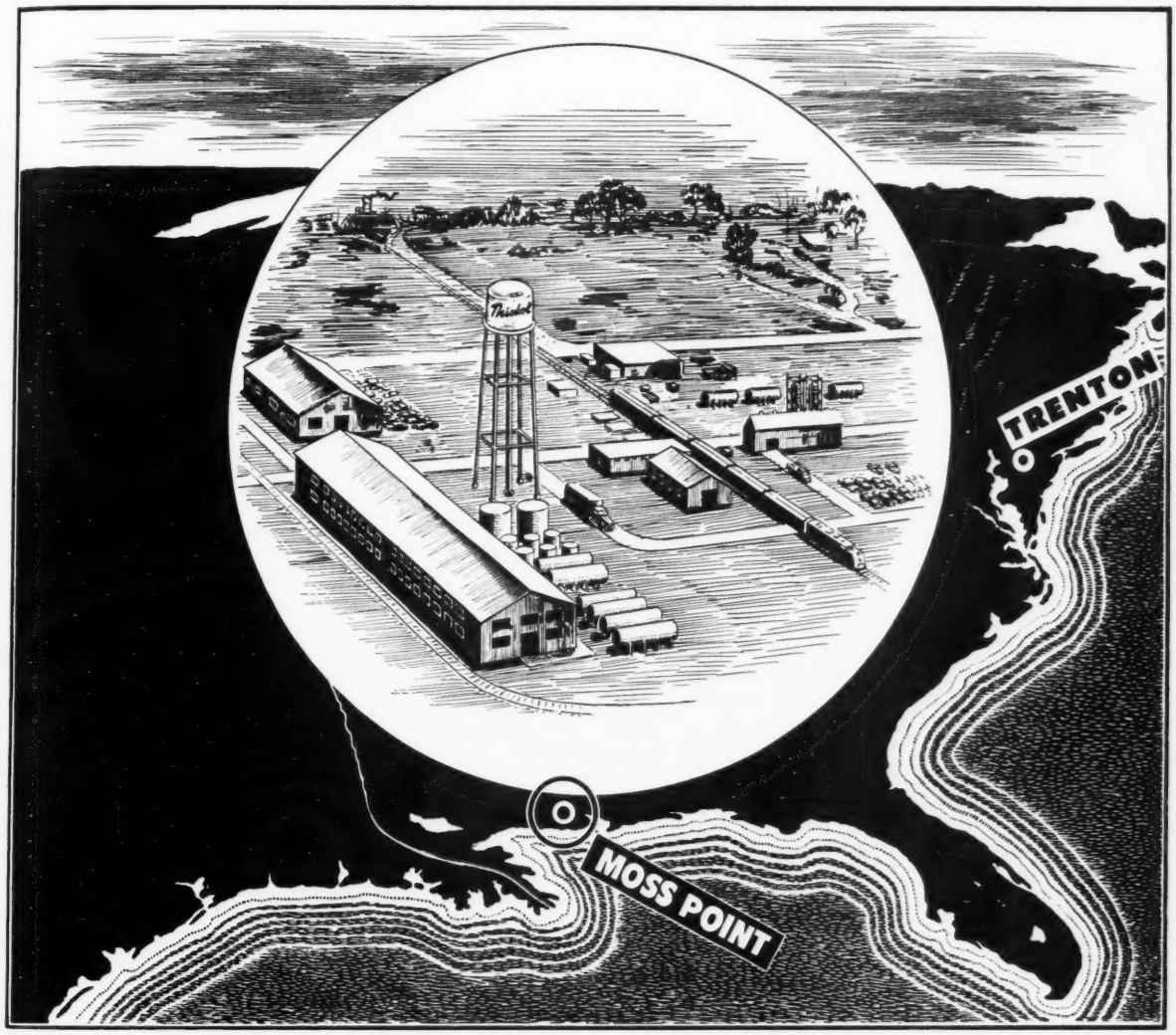
J. J. WHITE Products Co.
7000 UNION AVENUE
CLEVELAND 5, OHIO

Thiokol® Corporation's new plant at Moss Point, Mississippi is now in operation



Thiokol Corporation's new liquid polymer plant is now in operation at Moss Point, Mississippi. This modern plant is designed to produce both Thiokol polymers and one of the basic raw materials for their manufacture.

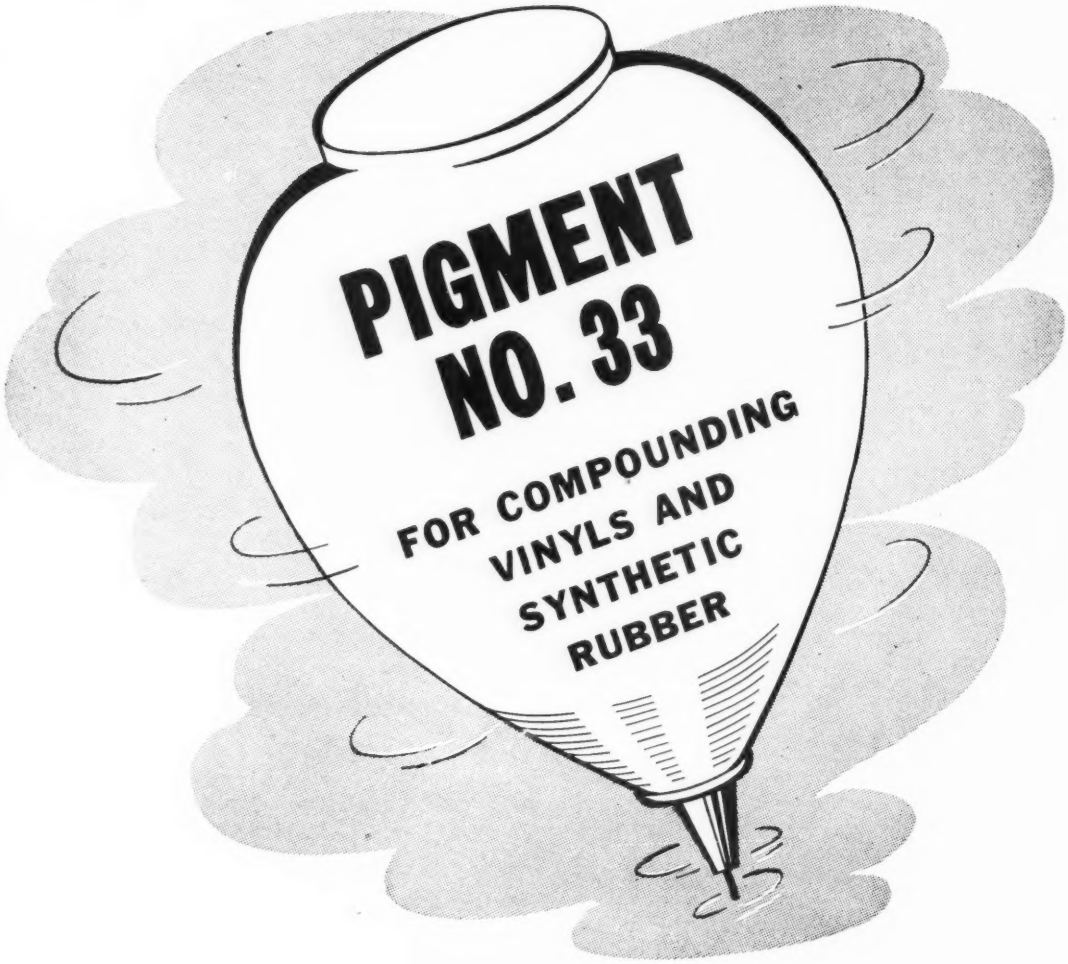
These new facilities have been engineered to meet today's military and industrial requirements. They are designed so that production can be rapidly expanded should the need arise.

Thiokol® CORPORATION

784 North Clinton Avenue, TRENTON 7, NEW JERSEY

*Thiokol, Reg. U.S. Pat. Off.

IT'S "TOPS"



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• COLOR

Sample and technical data sent promptly on request

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The walls come tumbling down!

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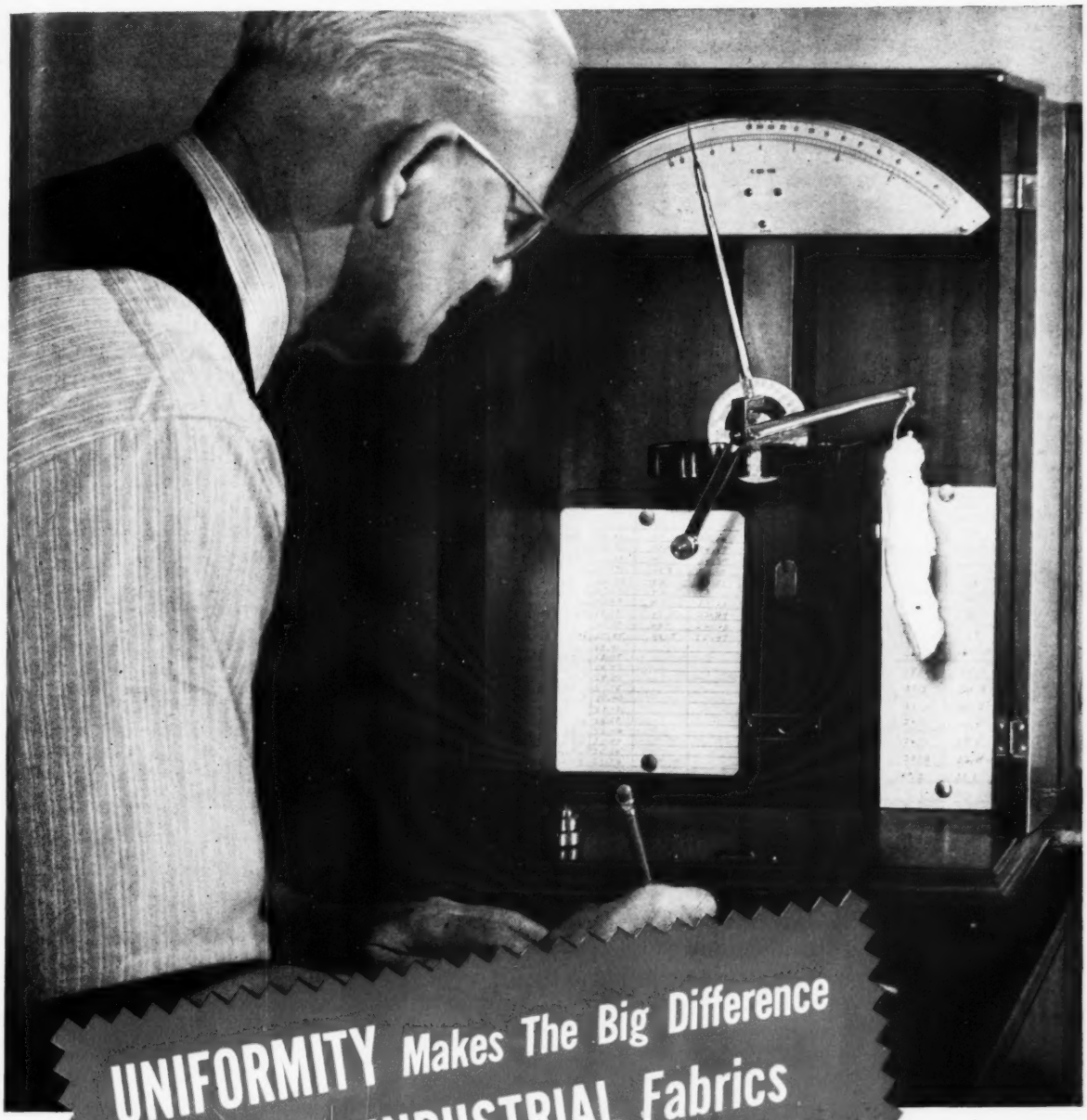

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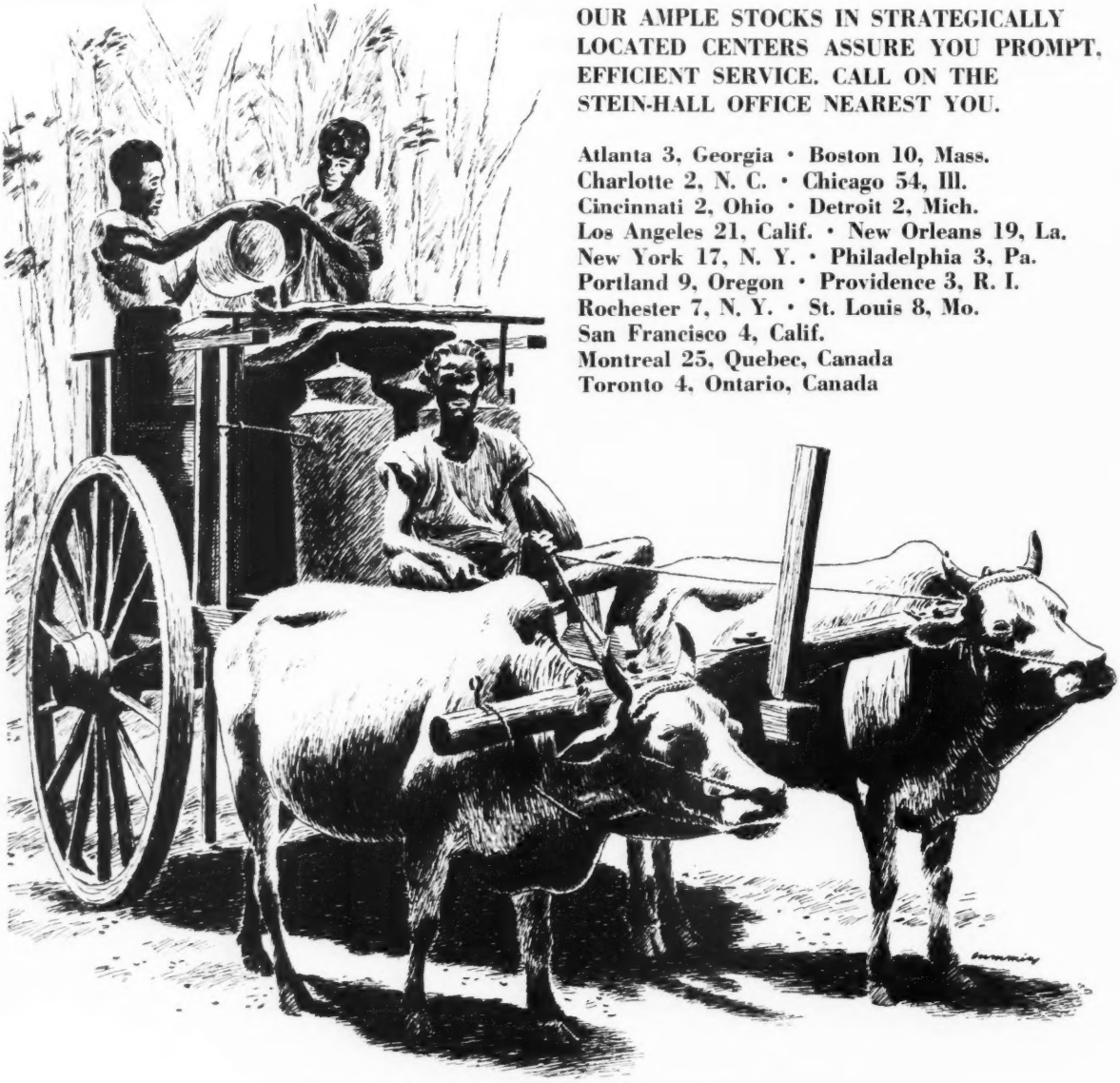

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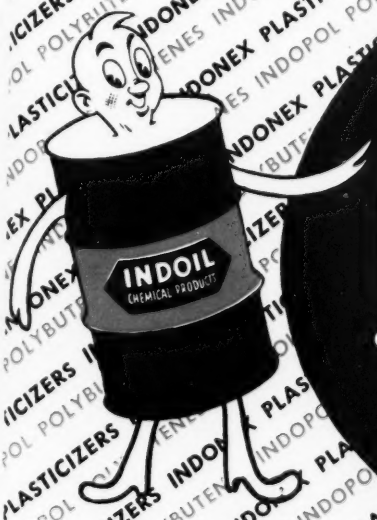

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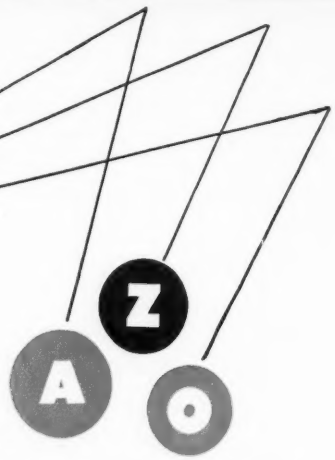

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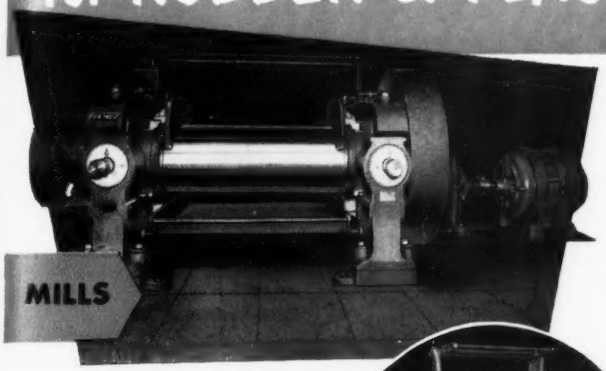

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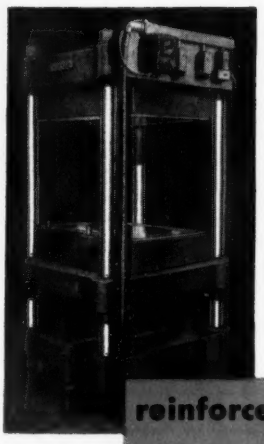

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THE INSTITUTION TODAY is the centre of a great fraternity of rubber manufacturers, scientists, technologists, research establishments, executives and students from every country whose object is the advancement of the cause of the rubber industry throughout the world.

OBJECTS: To promote corporate and concerted effort in the industry by bringing together all those engaged or interested in the various branches of science and technology on which the Industry is based and co-ordinating their respective contributions.

To promote the profession and practice of Rubber Technology.

To encourage the extension of scientific and technical education in the principles and details of rubber manufacture.

To maintain a scheme of Diplomas for the recognition of efficiency in knowledge of all branches of technology essential to the successful maintenance and development of rubber manufacture.

To arrange for the holding of meetings, the reading of papers and the giving of lectures with subsequent discussions and publication.

To foster the systematic study of scientific and technical problems involved in the various phases of the manufacture of natural and synthetic rubbers and rubber-like materials and their conversion into finished products.

To encourage original work and research dealing with the manufacture of rubbers.

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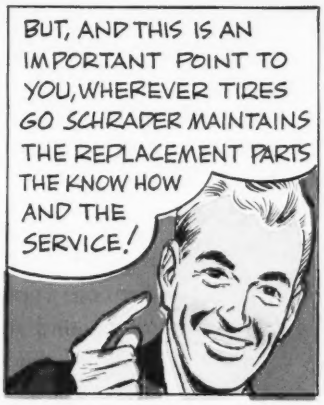
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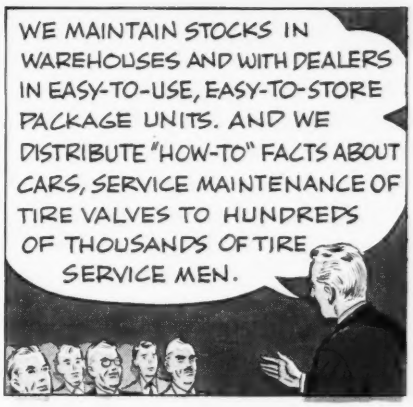
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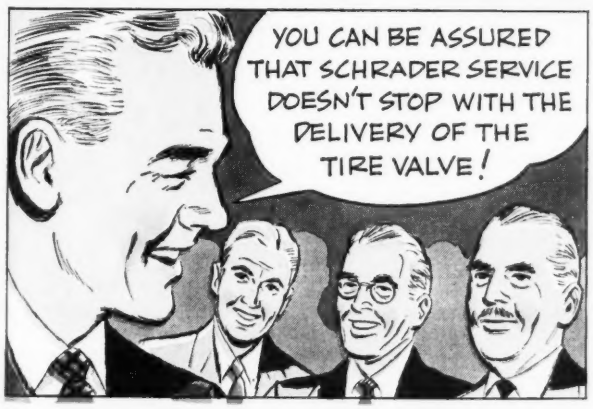

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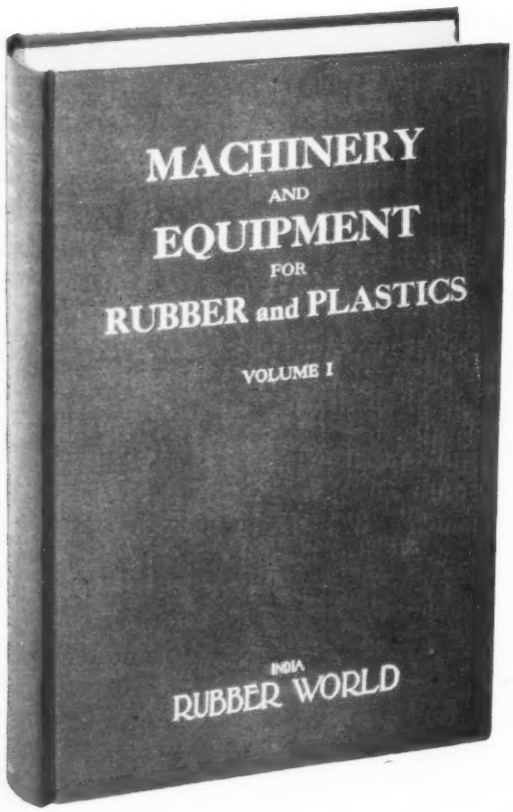

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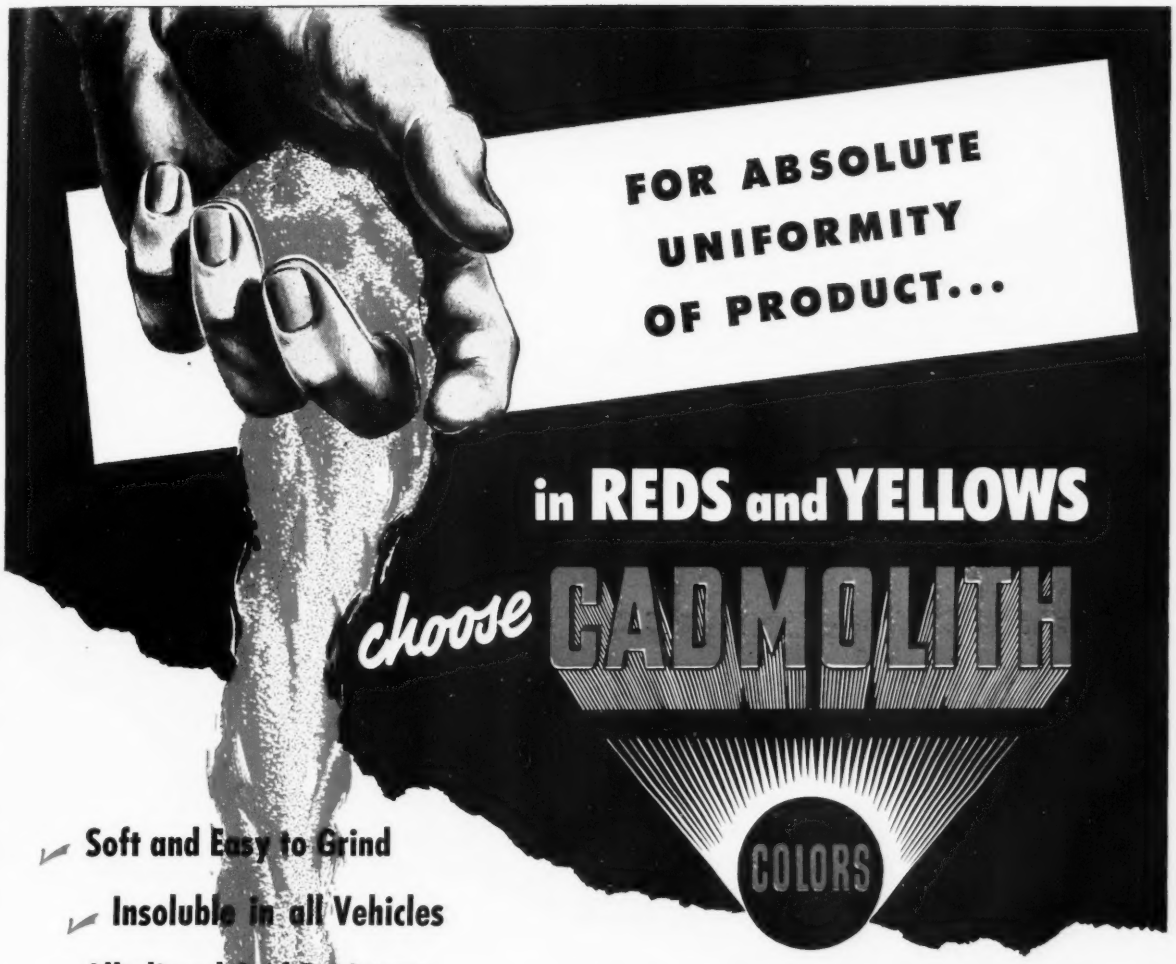

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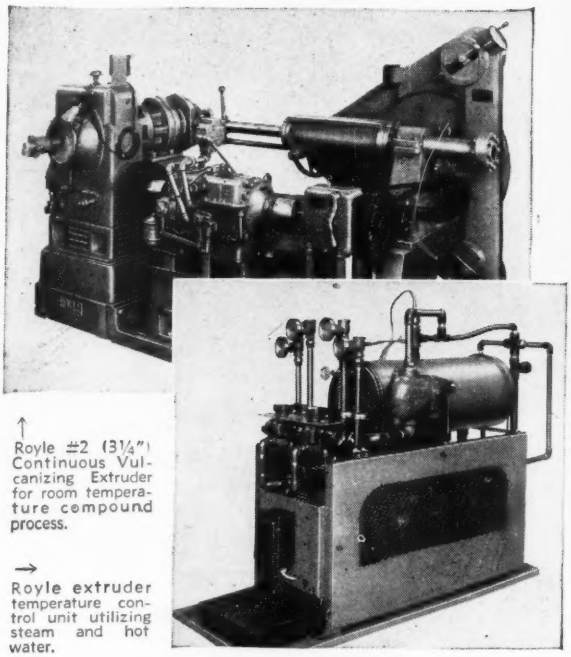

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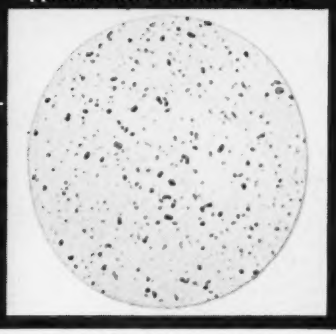

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H_2O soluble salts	.15
Insoluble in HCl	.15
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Representative Physical Tests

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Average numerical diameter D_1 – microns	.20
Average surface diameter D_3 – microns	.42
Specific surface – Sq.M./gram	2.59
Percent fines under .50 micron	35.0
Specific gravity	5.65
Apparent density – lb./cu. ft.	22.

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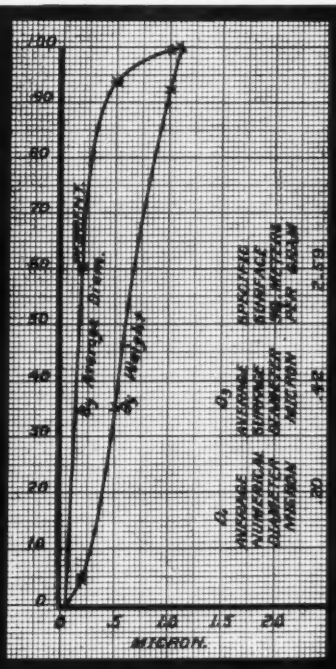

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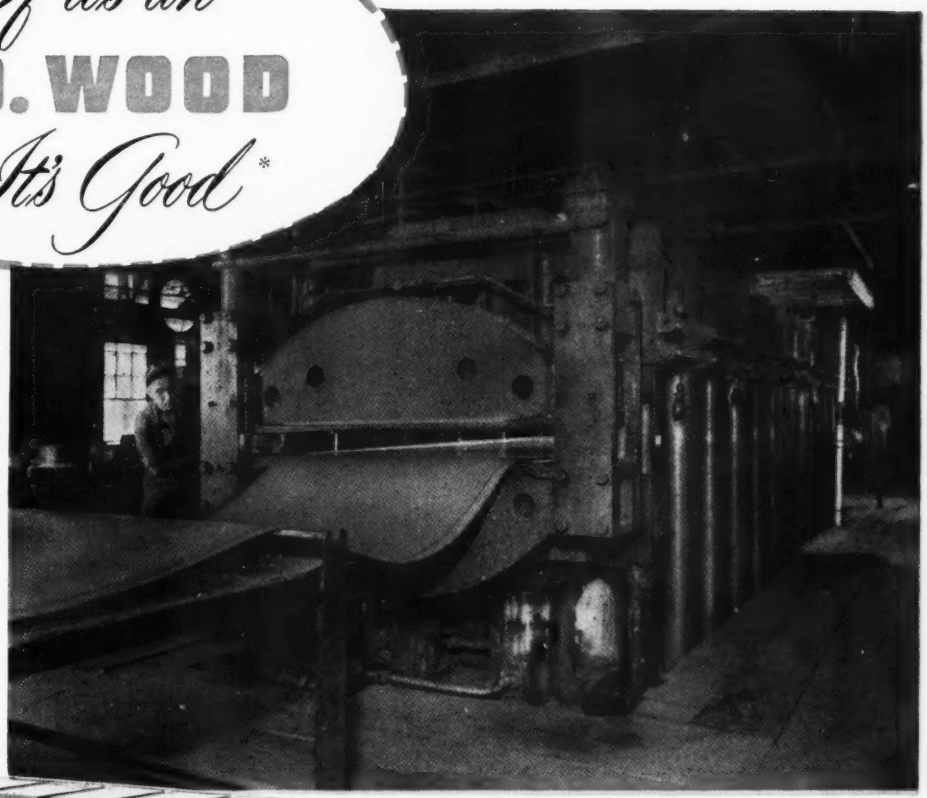

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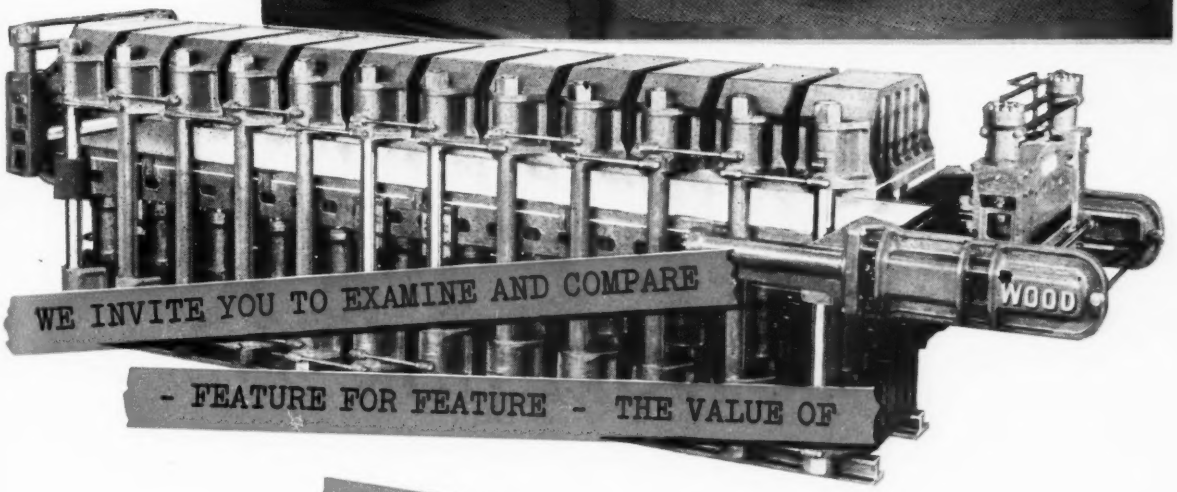

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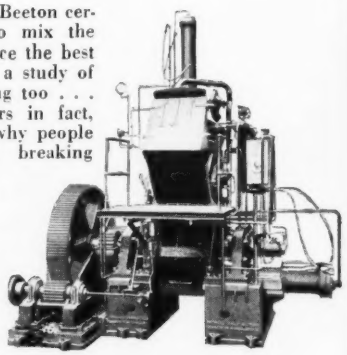

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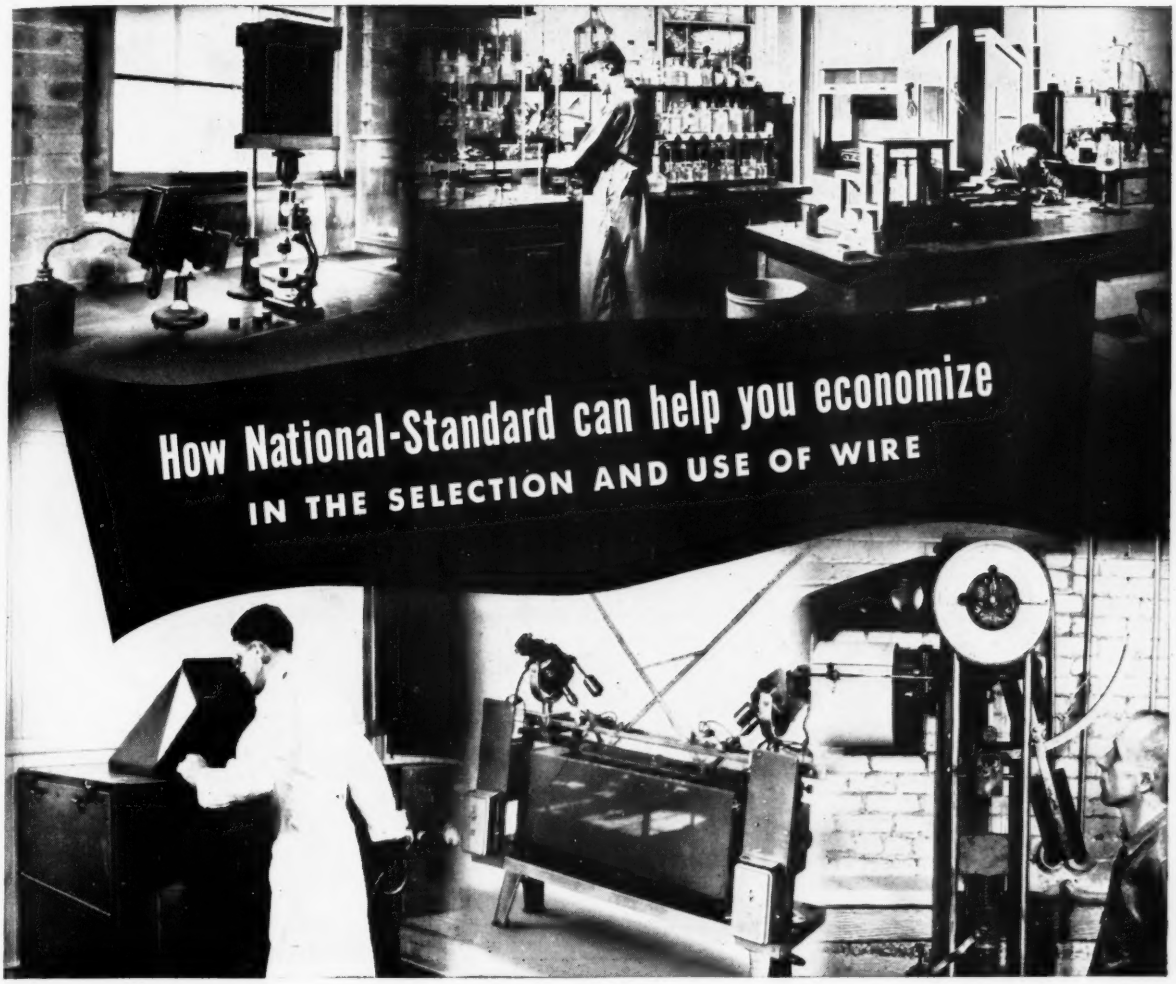

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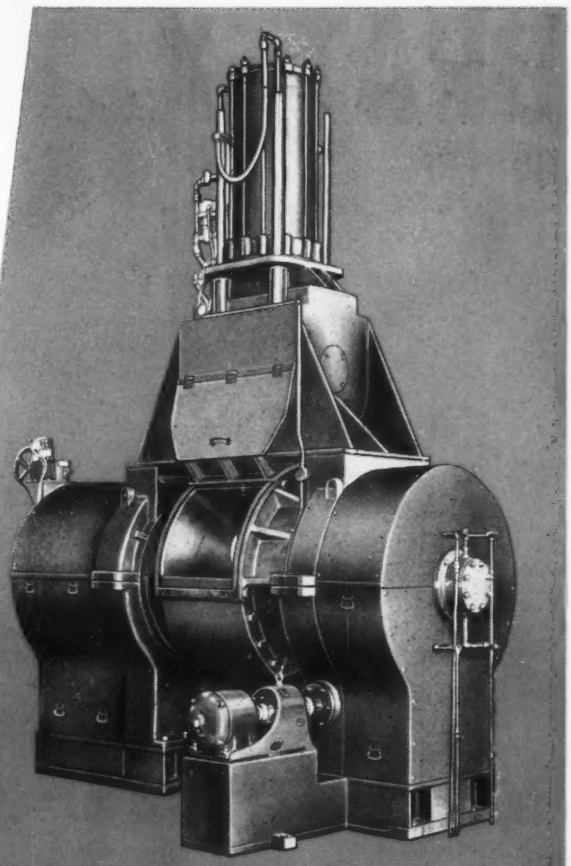

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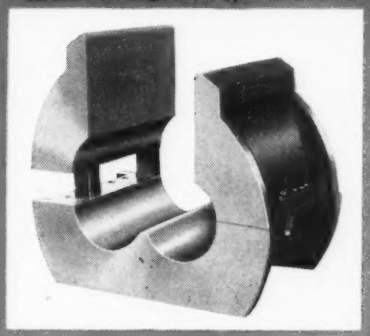

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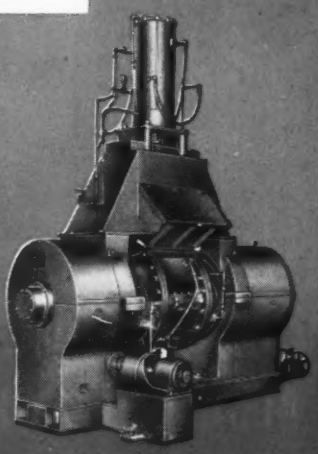

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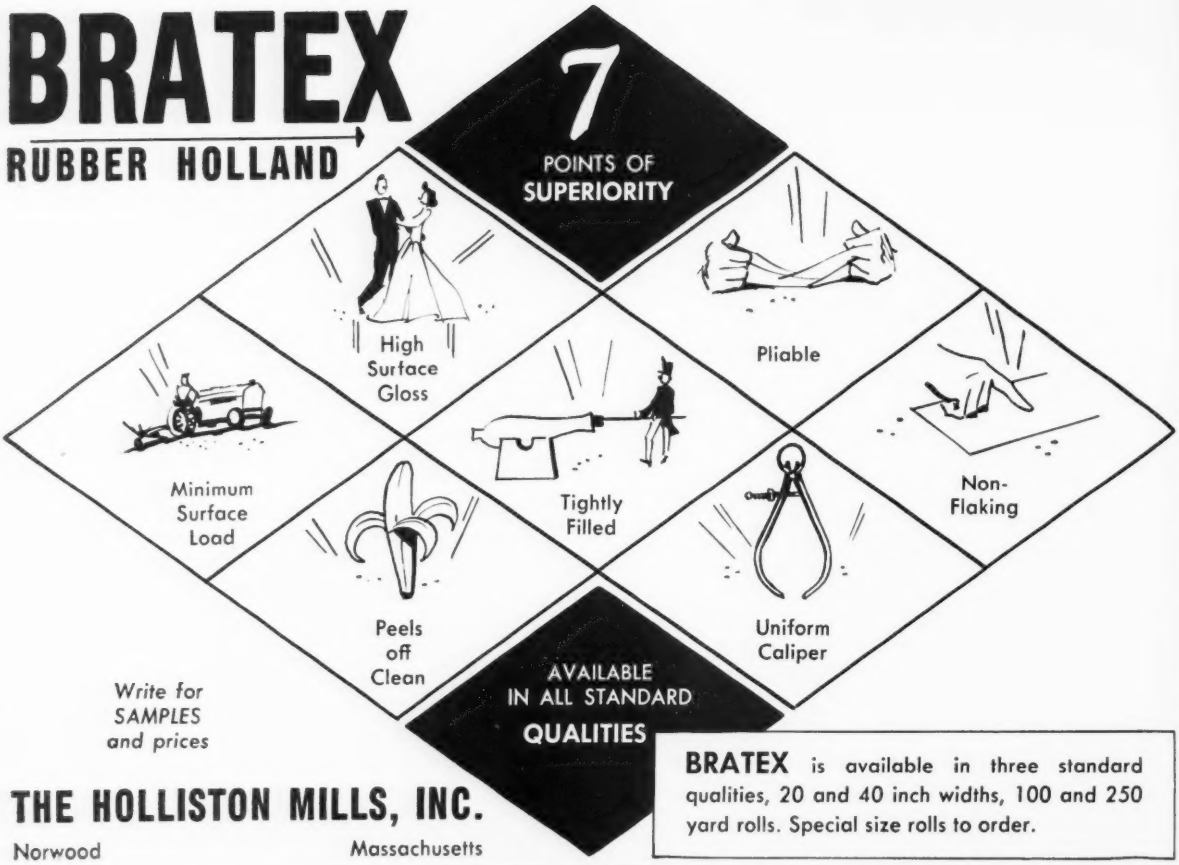

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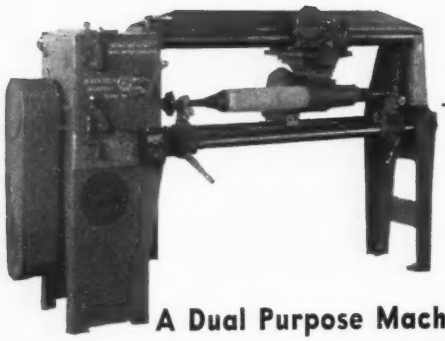

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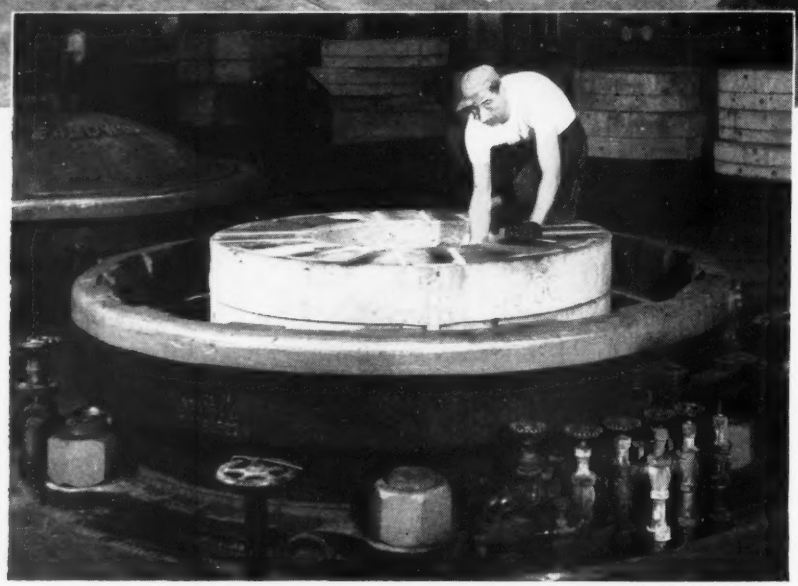

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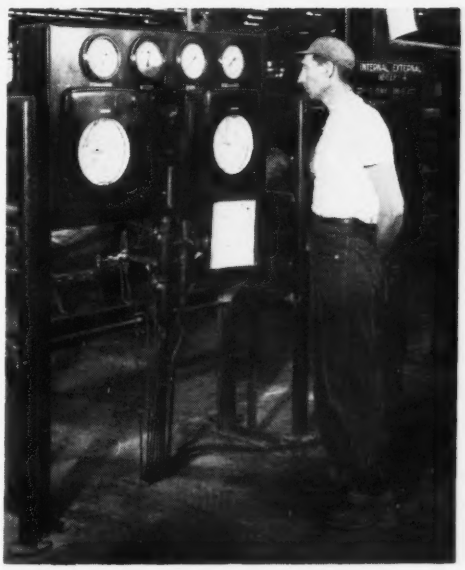

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INDIA
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WORLD

VOL. 126.—NO. 5 AUGUST, 1952

The Influence of Chemical Rubbers on Winter Driving[1]

N. S. Grace[2] and G. Winter[2]

THE problem dates back to the last war when chemical rubber tire treads were first introduced to the public as an emergency measure. In many parts of Canada and some of the northern areas of the United States a feeling arose among the users that the synthetic or chemical rubber treads provided less traction under winter driving conditions than did the natural rubber treads on which they had previous experience.

Adverse User Reaction to Chemical Rubbers

While the user reaction was not very sharply defined, it seemed as if the criticism applied particularly to the pulling capacity of synthetic rubber treads, i.e., their ability to start and accelerate the vehicle rather than their ability to stop it. Further, complaints were particularly concerned with driving conditions where hard-packed frozen snow and/or ice were involved.

In many areas wet pavement forms an important part of winter driving conditions; hence the relative traction of chemical *versus* natural rubber treads under such conditions is of considerable importance. Fortunately there seems to be fairly general agreement that chemical rubber treads are at least the full equal of natural rubber treads in traction on wet pavements, and, indeed, some observers, such as Robson,[3] rate synthetic rubber 8% better than natural rubber under these conditions. Wet pavement conditions, therefore, will not be considered further in this paper.

"Acceleration Test" Developed

The study of winter driving on snow and ice became the object of a number of investigations. These have included laboratory frictional measurements under controlled temperature conditions on ice surfaces as well as a wide variety of tire-vehicle tests. Laboratory results are often difficult to translate into terms of tire user reaction as applied to the wide variety of winter road surfaces supplied by nature. Actual road tests with rubber tired vehicles would, therefore, appear to present a more direct approach to the problem.

In our work, started during the Winter of 1948-49, we attempted to parallel closely the conditions of the complaint and to rate or measure the ability of rubber tired vehicles to start and accelerate on actual typical hard-packed frozen roads. A simple practical test referred to as "the acceleration test" was developed. This will be described later, and some typical data comparing natural and chemical rubber treads will be given.

Probably the most extensive work with vehicles to date has been a cooperative program coordinated by and carried out under the direction of the National Safety Council.[4] During the winters of 1949-51 NSC studied a number of surfaces including ice, hard-packed snow, loose snow, etc., checked on the influence of temperature, and carefully measured stopping, traction, and cornering abilities. The scale of these operations was such that nothing was spared with respect to vehicles, instrumentation, equipment, personnel, etc., with a view to assessing the hazards of winter driving from the safety angle. Comparisons of chemical *versus* natural rubber treads were included in this work.

In order to appreciate what is involved in the winter performance evaluation of tires, a glance at some of the findings of the National Safety Council is worthwhile. Tables Nos. 1 and 2 tabulate its evaluation of two similar conventional rib pattern tires, one with a natural rubber tread and the other with a cold GR-S tread. Stopping ability from 20 m.p.h. and traction ability, as measured by draw-bar pull, are shown for a variety of winter surface conditions, with corresponding tire ratings.

National Safety Council Data

Looking first at Table 1—the stopping ability, the cold GR-S treads rate 4% to 10% inferior to the natural rubber with varying surface conditions. However, turning to the feet or "distance traveled" figures, the profound effect of road surface conditions and temperature on tire performance is very apparent where stops from 48 to 209, and 53 to 227 feet are registered, and where ice at 20° F. is almost twice as "slick" as ice at 0° F.

[1] Presented before the Rubber Chemistry Division, Chemical Institute of Canada, Montreal, P. Q., June 4, 1952.
[2] Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada.
[3] J. J. Robson, "Safety and Ease of Car Handling." Paper presented at SAE meeting, Detroit, Mich., Mar. 4-6, 1951.
[4] NSC—Committee on Winter Driving Hazards, Chicago, Ill. Various pamphlets covering 1949-51 activities, especially "A Comparison of the Effectiveness of Winterized Mud-Snow Tires on Snow and Ice."

Fig. 1. Mercury V-8 Test Truck Used for "Acceleration Test"

Bearing in mind that these same tires will stop a car from 20 m.p.h. on dry pavement in approximately 21 feet, and while a 4-10% difference between the tires under winter conditions exists, it is quite obvious that the sensible driver will have to adjust his driving habits very extensively with either tire to meet the varying winter road conditions which reduce stopping efficiency by as much as 90% if he is to achieve safety. The small difference in stopping distance between the two rubbers should not be ignored, but road conditions would appear to play by far the major role for stopping ability.

TABLE 1. STOPPING ABILITY (FROM 20 M.P.H.)

	Ice at 0° F.		Ice at 20° F.		Granular Ice Loose Snow		Packed Snow	
Tire Tread	Feet	Rating	Feet	Rating	Feet	Rating	Feet	Rating
Natural Rubber	114	100	209	100	48	100	62	100
Cold GR-S	123	93	227	92	53	90	65	96

TABLE 2. TRACTION ABILITY (DRAW-BAR PULL AT CONSTANT SLIPPAGE)

	Ice at 25° F.		Granular Ice Loose Snow		Packed Snow	
Tire Tread	Lbs.	Rating	Lbs.	Rating	Lbs.	Rating
Natural Rubber	143	100	391	100	301	100
Cold GR-S	123	86	254	65	205	68

Now looking at Table 2—the traction ability ratings, it will be observed that the difference here between the two rubbers is of greater magnitude than in stopping ability, and that draw-bar pull in pounds will vary quite widely with surface conditions, as might be expected.

These figures, as quoted, should throw some light on the profound effect of surface conditions on the performance of tires in winter. Smooth, hard surfaces, such as glare ice or melted and refrozen snow which rubber cannot cut into, bite, or grab, will reduce performance almost to the coefficient of friction between the tire tread rubber and the road surface. On the other hand, rough or soft surfaces will permit some degree of tread pattern bite or grab combined with frictional values. Overriding all these physical surface conditions will be the lubricating effect of moisture, more readily generated by slippage at temperatures near the freezing point.

"Acceleration Test" Data

It was our desire to develop some relatively simple and practical tire-vehicle test on actual roads by which the "slipperiness" of various rubber tread compounds might be rated, and from which some estimate of user reaction could be obtained. Initially, two cars of similar make and model were equipped with natural rubber and GR-S tires and put through their paces on a snow-covered road by each of four drivers who, after the test, were in complete agreement as to the general handling characteristics which they found. This, however, yielded only expressions of opinion and gave no quantitative measure of differences.

Since the ability to start and accelerate was the main complaint, and since the difference in tread compounds could be well demonstrated in this respect, it was thought that some form of acceleration test might prove useful. These test car drivers were, therefore, asked to try accelerating from a standing start to 25 m.p.h. as rapidly as they could, using second gear only, and to make a number of acceleration runs over the same course while a rider timed them with a stop-watch. After a little practice with this technique, the relation in acceleration time between the two sets of tires, as established by individual drivers, showed remarkable agreement. Furthermore the agreement in times established by various drivers was also encouraging. It became evident that to gain maximum acceleration, wheel spin must be indulged in, but that excessive wheel spin would either slow the rate of forward acceleration or spoil the run entirely with side-slip. Practice in acceleration soon developed in an expert driver a strong sense of the "feel" of the car and the control he could maintain with any particular set of tires.

With the natural rubber tires good uniformity among several accelerations was usually obtained. With chemical rubber treaded tires the average acceleration time was generally longer, and the variations from run to run were often greater owing to the greater difficulty of control.

After these initial trials had shown distinct promise, the test vehicles were equipped with speedometers geared to the front wheels to avoid the registration of wheel spin which occurred in the normal transmission hook-up. While duplicate test vehicles are preferable to reduce the influence of temperature, the test can be carried out efficiently with one vehicle carrying several sets of experimental tires already mounted on wheels with alternate sets of runs made on the control tires. In either case, two experienced drivers accompanied each vehicle, and, after a typical winter road surface had been selected as a test course, each driver made a series of 12 acceleration runs, six in each direction, while his companion timed the runs with a stop-watch. Second gear only was employed in accelerating from a standing start to 25 m.p.h. (based on front-wheel speedometer). Tires of the same conventional rib pattern in size 6.70-15 were always used at the same inflation, but with various tread compounds.

Figures 1 and 2 show a typical test vehicle with a front-wheel speedometer connection; while Figures 3 and 4 show typical winter road conditions. Figure 3, showing hard-packed frozen snow is, in our opinion, fairly representative of the winter driving conditions which

Fig. 2. Front-Wheel Speedometer Arrangement on Truck Used

led to adverse user reaction on chemical rubber treads and, hence, has been favored, where obtainable, for our acceleration tests. Temperatures were for the most part in the 20's degrees Fahrenheit. Occasionally lower temperatures were available, and these generally improved traction ability in comparison with higher temperatures, which is in agreement with the NSC findings. Courses were selected for their flatness, but, as few roads are perfectly level for any distance, it was felt that this disadvantage was canceled out by making runs in both directions, and this was supported by running some tests.

The acceleration times on each of the sets of tires under test were averaged and then rated against the controls at 100. This system gave a measure of the degree of difference. The temperature and road surface conditions were recorded. Drivers' comments were also recorded since, as mentioned before, the driver could not but develop a strong sense of the "feel" of the car. Furthermore, in running over a course it was necessary to turn the vehicle at each end in driveways or occasionally shallow ditches, which action at times resulted in difficulties with some tires and not with others. The Toronto area does not, as a rule, provide snowy road conditions very generously, but, whenever possible, comparisons of experimental compounds with the controls were made on several occasions and under a variety of conditions.

It is interesting to compare the NSC rating of cold GR-S on draw-bar pull under snow conditions with the acceleration test. Here the NSC obtained a 32-35% (Table 1) inferiority; while the acceleration test indicated 29% (Table 3).

TABLE 3. REPRESENTATIVE ACCELERATION RATINGS OF VARIOUS TREAD COMPOUNDS ON PACKED SNOW ROADS

Tread Hydrocarbon Content	Acceleration Time Rating	Efficiency Rating
100% Natural rubber	100	100
70% N.R. plus 30% Polysar S (hot GR-S)	100	100
60% N.R. plus 40% Polysar Krylene (cold GR-S)	100	100
40% N.R. plus 60% Polysar Krylene (cold GR-S)	130	77
100% Polysar S (hot GR-S)	150	67
Krylene (cold GR-S)	140	71
XPRD-70 (90-10 charge ratio cold)	128	78
Krynol (oil-extended cold GR-S)	110	91

Table 3 shows representative acceleration test ratings both in respect to time and the reciprocal for efficiency, as compared with those for natural rubber. Some seven different tread compounds are covered including several types of chemical rubber and some in admixture with natural rubber. Referring to the center of the list, the rating of the original GR-S tread (Polysar S) will be noted as 33% inferior, and the field reaction to this tread is well known and may be considered as a yardstick. It is interesting to note that up to 40% of chemical rubber can be incorporated with natural rubber for the hydrocarbon content of a tread compound without apparent effect on its winter traction characteristics (acceleration rating). In fact these treads have been utilized in output tests without adverse comment on winter traction from the field. The next step tried (namely, 60% chemical rubber content) resulted in the chemical rubber characteristics predominating.

Fig. 3. Hard-Packed Snow Test Course

Fig. 4. Loose-Packed Snow Test Course

With the 100% chemical rubber treads, hot GR-S (Polysar S) and cold GR-S (Polysar Krylene) had the poorest acceleration ratings. Some improvement was indicated with an experimental polymer designed for arctic service (Polysar XPRD-70—90 10 charge ratio).

With Polysar Krynol (oil-extended high Mooney cold GR-S polymer), however, the difference between chemical and natural rubber was very substantially reduced. In fact, in making the acceleration runs it was difficult to detect any difference regarding the ease of control that could be maintained so that under many circumstances it was felt that the average driver would be unable to pick up the small 9% difference. Such small differences, however, are brought to the fore in those instances during some three different tests on Krynol where small gradients were encountered at the turning points, and the Krynol treads presented some difficulty in maneuvering that did not show up with the controls.

Summary and Conclusions

Some of the ratings already given in this paper are summarized in Table 4 and support the user reaction that some of the S-type polymers are inferior to natural rubber in traction and accelerating ability on snow and ice surfaces. On the other hand, one of the newer polymers of the oil-extended type appears to have substantially narrowed this gap. Further, traction on wet pavement and cornering on ice appear to favor some of the chemical rubbers; hence, we are rapidly approaching the position so familiar in the rubber industry where selection of tread polymer with regard to driving under winter conditions is becoming a *Compounder's Choice!*

TABLE 4. SUMMARY—SELECTED RATINGS—CHEMICAL RUBBERS VERSUS NATURAL RUBBER

Conditions	Chemical	Natural
Wet pavement*	108	100
Stopping—snow and ice†	§93 (cold)	100
Pulling—snow and ice†	•73 (cold)	100
Acceleration—packed snow‡	71 (cold)	100
	91 (oil-extended)	100
Cornering ability—ice†	107 (cold)	100

* Robson (see footnote[3]).
†National Safety Council.
‡Present paper.
§Average of ratings from Table 1.
•Average of ratings from Table 2.

Fortunately, the chemical rubbers are man-made and, hence, capable of improvement through research and development. The wide range of road conditions encountered have such a profound influence on winter driving and safety that the synthetic rubber industry should not rest on its oars when natural rubber has been fully equalled for this service, but press on toward polymers with reduced sensitivity to winter driving conditions.

Fractionation of Fresh and Preserved *Hevea* Latex by Centrifuging

G. Verhaar[1]

RUBBER research workers in the Far East found that fresh *Hevea* latex is not merely an emulsion of rubber particles in an aqueous serum, but contains two dispersed phases: rubber globules, and small irregularly shaped, viscous colloidal bodies, which they called "lutoids," on account of their more or less yellow color (1-4).[2] On centrifuging fresh undiluted latex these lutoids are collected at the bottom of the tube as a separate layer with a sharp boundary. The upper layer was called the "white fraction," and the under layer the "yellow fraction."

These research workers, L. N. S. de Haan-Homans and G. E. van Gils, claim that the lutoids dissolve in ammonia and other alkalies, coagulate, when latex is diluted with water, but retain their form if the latex is diluted with salt solutions of certain concentrations. These workers also claim that fundamentally these lutoids do not contain rubber, but because they easily stick together and form large bodies, these bodies nearly always enclose rubber particles and sometimes also a Frey-Wyssling globule. From calculations relevant to the DRC, the TS, and other data of the yellow fraction, it appears that the lutoids consist for the greater part (80-85%) of water; whereas the dry material consists of proteins, salts, acetone solubles, and probably also sugars. This dry material represents 6-8% of the total solids of the latex.

Although this work undoubtedly was an important step forward on the road to a better understanding of the complex system of *Hevea* latex, many questions still remain to be answered. One of these questions is the variability in volume, color, and behavior on standing (spontaneous coagulation) of the "yellow fraction" for different clones. Another one is the influence of preservatives, other than ammonia, on the fractionation of undiluted field latex by centrifuging. De Haan-Homans and van Gils found that when ammoniated latex was centrifuged in a tube, no separation of yellow particles took place, but no mention was made of the influence of sulfite or other preservatives. The object of the present series of experiments was to repeat their investigations as far as untreated, diluted, and ammoniated latex is concerned, to gather quantitative data concerning the fractionation of these latices, and furthermore to establish the influence of other preservatives, viz., sodium sulfite and formaldehyde on fractionation by centrifuging of clonal latex.

From all the latices under investigation samples were also taken for microscopic study, whereby attention was focussed on the presence, size, and shape of the lutoids and Frey-Wyssling particles in undiluted latex, in latex treated with water, ammonia, sulfite, or formaldehyde, before and after centrifuging.

General Procedure

The latex to be investigated was collected from the cups during the early morning hours, then brought to the laboratory, screened through a round-hole sieve having perforations of diameter 0.5-millimeter, and treated with various amounts of preservative or water.

To study the effect of dilution, 100 milliliters of latex were mixed with 5, 10, and 20 milliliters of distilled water, respectively, and centrifuged together with an untreated sample.

The effect of sodium sulfite on fractionation was ascertained by adding to 100 milliliters of latex two, four, and six milliliters of a 5% Na_2SO_3-solution, which brings the end concentration to 0.10%, 0.19%, and 0.28%, respectively, followed by centrifuging together with an untreated sample.

In the same way 100 milliliters of latex were treated with one milliliter, two and four milliliters of a 25% ammonia solution (end concentration: 0.25%, 0.49%, and 0.96%) and with one milliliter, two and four milliliters of a 5% HCHO-solution (end concentration: 0.05%, 0.10%, and 0.19%).

From each of these treated latices, together with an untreated sample, 50 milliliters were centrifuged in a 50-milliliter graduated centrifuge tube for five minutes; then the volume of underlayer (if any) and the color and color distribution in that layer were noted. The same samples were then run for 15 minutes (second run) and another 15 minutes (third run) to follow the effect of the time of centrifuging on the volume, color, and color distribution of the underlayer. The centrifuge used was an "International" laboratory centrifuge, Size 1-SB, and the tubes were run at a speed of 2,000 rpm.

These experiments were carried out with latices from six different clones, Bodjong Datar 5, Prang Besar 186, AVROS 49, Waringiana 4, Tjirandji 16, and AVROS 152. According to Kidder (5), a clonal color rating may be given from visual observation of clonal crepe samples and by measuring the amount of yellow color in the acetone extract, in which BD. 5 and AV. 152 appear low in the scale, AV. 49 and Tj. 1 belong to the medium-colored crepe rubbers, and PB. 186 and War. 4 yield the most intensively colored crepes. Of these clones War. 4 shows a tendency for some crepe samples to darken rapidly on standing in air, and it will be of interest to compare these findings with the properties of the white and the yellow fractions of these clones.

Influence of Water

De Haan-Homans and van Gils found that by adding pure water to undiluted fresh latex the lutoids shrank and coagulated and that their viscous colloidal nature disappeared so that they became rigid solid agglomerates. These researchers also found that when latex is diluted with a large quantity of water, no separation into two fractions occurred; the addition of 10% of water produced a marked reduction in the quantity of the separated yellow fraction, and when 25% of water was

[1]Firestone Plantations Co., Liberia.
[2]Numbers in parentheses refer to Bibliography items at end of this article.

added, it became impossible to separate the yellow fraction by centifuging.

In general these findings could be confirmed, as will be clear from the data collected in Table 1. For most latices a five-minute run at 2,000 rpm. was too short for any visible separation even in the control undiluted sample: whereas a 20-minute run was sufficient for all dilutions except for AV. 49 and Tj. 1 latex, for reasons which will be explained later. Another 15-minute run usually brought about a slight increase in volume of the underlayer. Although the addition of water influenced the volume of the underlayer in all cases, there are marked clonal differences. Addition of 5% of water had no effect in BD. 5, Tj. 1, and War. 4 latex, a slight effect in PB. 186 latex, and a considerable effect in AV. 152 and AV. 49 latex, decreasing the volume of the former to 50% and of the latter to as low as 36%.

TABLE 1. INFLUENCE OF DILUTION ON FRACTIONATION OF FRESH LATEX BY CENTRIFUGING

I – untreated latex
II – 100 ml. latex + 5 ml. H_2O
III – 100 ml. latex + 10 ml. H_2O
IV – 100 ml. latex + 20 ml. H_2O

Runs of 50 milliliters each.

	BD. 5 Ml.	AV. 152 Ml.	AV. 49 Ml.	Tj. 1 Ml.	PB. 186 Ml.	War. 4 Ml.
Volume Underlayer after First Run (5'/2,000 Rpm.)						
I	7.0	?	?	?	?	8.5
II	7.0	?	?	?	?	5.5
III	6.0	?	?	?	?	5.5
IV	?	?	?	?	?	0.1
Volume Underlayer after Second Run (15'/2,000 Rpm.)						
I	6.8	7.0	6.5	11.5	5.8	9.0
II	6.2	4.2	1.8	11.0	5.8	9.5
III	6.2	0.8	?	11.0	5.8	9.2
IV	0.5	0.6	?	?	4.5	0.8
Volume Underlayer after Third Run (15'/2,000 Rpm.)						
I	6.5	9.0	7.0	11.0	7.5	9.5
II	7.0	4.6	2.5	11.2	6.8	9.5
III	6.0	0.8	...	11.0	6.3	9.5
IV	0.6	0.8	...	...	?	2.0

The volume of the underlayer in the control sample varied from 13.6% for BD. 5 to 22.0% for Tj. 1 latex. Addition of 10% of water brought about no further decrease in volume for Tj. 1 and War. 4 latex, a slight decrease for BD. 5 and PB. 186 latex, and a considerable further decrease for AV. 152 latex. In the case of AV. 49 latex it was observed that after the third run the "white fraction" was yellow, and the "yellow fraction" was white!

On further visual and microscopic investigation the cause of this last-mentioned phenomenon with AV. 49 latex became clear. Under influence of the water of dilution precoagulation had set in, in which process a portion of the rubber particles coalesces around and on the surface of the lutoids, which act similarly to nuclei in the process of crystallization. As virtually all Frey-Wyssling globules containing the coloring matter are embedded in the lutoids, they automatically became part of the precoagulum. When, therefore, latex is centrifuged during the process of spontaneous fractional coagulation, the precoagulum, gathers in the upper half of the tube, and the remaining latex—which contains only very fine lutoids and hardly any loose Frey-Wyssling particles and therefore appears white—gathers in the under half of the tube. This phenomenon was observed on AV. 49 latex diluted with 10 and 20% of water and on Tj. 1 latex diluted with 20% of water. In all other cases precoagulation apparently had not yet set in (this was from three to six hours after tapping), but with a dilution of 20% practically no fractionation took place; only a slight amount of "sludge" gathered at the bottom of the tube.

In the case of PB. 186 latex after the second run two layers could be observed, one with a normal boundary, formed by a yellow zone, and on top of that a second greyish-white layer of about two milliliters. These two layers more or less amalgamated during the third run, giving a very vague boundary with the upper layer.

It can therefore be concluded that clonal differences in the dilution effect on fractionation are very marked; War. 4 and Tj. 1 latex are the most stable in this respect; BD. 5 and PB. 186 latex take a middle position, and AV. 152 and AV. 49 latex are the most sensitive.

Influence of Sodium Sulfite

Introductory work on this subject was done by Rand and Kidder (6). They found that the use of sodium sulfite in fresh latex does not prevent the separation of fresh latex into "white" and "yellow" fractions. This separation was observed for a variety of latices, when a small-batch centrifuge was used, in which samples of sulfite preserved field latex from 12 clonal areas were spun in 50-milliliter tubes at 2,000 rpm. for 30 minutes. For these latices the amount of yellow fraction varied from 16 to 38%.

The present series of experiments on sulfite treated clonal latex was set up along the same lines as described before, using samples of fresh latex having no preservative and treating these samples after screening with different amounts of 5% sodium sulfite solution up to concentrations of 0.10, 0.19, and 0.28% respectively. The relevant data are given in Table 2. As in former experiments a five-minute run was not sufficient for visible fractionation of most untreated latices, but was so for others. A 20-minute run, however, was sufficient for all latices to separate into two fractions.

TABLE 2. INFLUENCE OF SODIUM SULFITE ON FRACTIONATION OF LATEX BY CENTRIFUGING

I – untreated latex
II – 100 ml. latex + 2 ml. Na_2SO_3-sol. 5% (c – 0.10%))
III – 100 ml. latex + 4 ml. Na_2SO_3-sol. 5% (c – 0.19%)
IV – 100 ml. latex + 6 ml. Na_2SO_3-sol. 5% (c – 0.28%

Runs of 50 milliliters each.

	BD. 5 Ml.	AV. 152 Ml.	AV. 49 Ml.	Tj. 1 Ml.	PB. 186 Ml.	War. 4 Ml.
Volume Underlayer after First Run (5'/2,000 Rpm.)						
I	?	?	?	?	6.5	10.0
II	16.0	?	13.0	12.5	3.8	?
III	13.5	?	12.0	9.7	2.4	?
IV	12.0	?	11.0	7.0	2.4	?
Volume Underlayer after Second Run (15'/2,000 Rpm.)						
I	13.0	8.3	....	15.0	6.3	10.5
II	11.0	9.6	11.2	12.3	6.4	10.0
III	9.5	8.5	11.0	11.0	4.5	8.5
IV	8.7	8.3	9.3	10.0	4.5	8.5
Volume Underlayer after Third Run (15'/2,000 Rpm.)						
I	11.8	8.7	....	15.0	6.4	10.5
II	10.5	10.3	11.0	12.0	6.2	10.0
III	9.5	9.5	10.5	11.3	4.5	9.0
IV	8.7	9.0	9.3	10.5	4.5	9.0

Addition of sulfite did not prevent this separation, but it is clear from the data in Table 2 that it decreased the volume of underlayer considerably. This statement does not necessarily mean an incomplete separation as the volume of underlayer not only depends on the amount of viscous material by weight, but also on the packing, i.e., the size distribution of the lutoid particles, and on the density of the individual particles. If sulfite changes the physicocolloidal properties of the lutoids, causing shrinkage or changes in the size distribution, the separation may be as complete as in the control sample. This point can be checked by microscopical observation of the various upper layers, which will show the presence, number, and size of lutoids in the upper layer after centrifuging. From these observations it can be said that addition of sulfite to fresh uncentrifuged latex tends to disintegrate the lutoid-complex to a certain extent and then prevents

the separation of the small sized particles by centrifuging. Hence the decrease in volume of the underlayer may be caused partly by incomplete separation and partly by a decrease of the packing volume.

It was, furthermore, observed that this lutoid disintegration sets free part of the Frey-Wyssling globules. On centrifuging, most of these globules are separated and form a bright yellow zone on top of the underlayer or bright yellow stretches in the upper portion of the underlayer. A certain part, however, remains in the upper layer.

It can therefore be concluded, that although sulfite does not prevent the separation of a yellow fraction, it hampers the complete removal of small sized lutoids and of Frey-Wyssling globules from the white fraction.

As can be readily observed, there are wide variations in the appearance of the yellow fractions of the various latices. The yellow fraction is not a simple and homogeneous material, but instead appears to consist of a light-grey pasty material with the yellow coloring matter distributed within it in a variety of forms, in some cases as a definite band between the yellow and the white layers, in others as large irregular yellowish globs giving the yellow fraction a mottled appearance; in others it appears to be more or less evenly distributed throughout the yellow fraction, giving it a definite yellow color.

This color distribution depends even for a given clonal latex on the time of centrifuging and the preservative used. It was often observed that after centrifuging for five minutes, the yellow coloring matter was concentrated in a definite zone on top of the underlayer; whereas after centrifuging for 20 minutes or more it occurred as large irregularly formed streaks in the underlayer. In some untreated latices it appeared to be more or less evenly distributed throughout the underlayer; whereas the same latex treated with sulfite gave an underlayer in which the greyish white and the bright yellow parts were clearly distinguishable.

Careful observation of these phenomena in a large number of latices, together with a microscopic study of the occurrence and distribution of Frey-Wyssling globules in the lutoids of various latices, leads to the conclusion that the yellow color is not an intrinsic property of the viscous material called "lutoids" by De Haan-Homans and van Gils; the yellow pigment [probably a carotenoid as Eaton and Fullerton (7) showed] occurs in the Frey-Wyssling globules dissolved in the fatty-like substances which constitute these globules. It therefore seems that the name "lutoid" (derived from the Latin *luteus* = yellow) is not a very appropriate one. High viscosity being a true characteristic of this material it is proposed to name these particles "viscoids."

The following quotation is from one of van Gil's publications (4):

"One is inclined to presume that a yellow latex should contain a greater amount of yellow fraction than white latex. This has been proved not to be the case. The amount of yellow fraction, i.e., the collection of all lutoids and Frey-Wyssling globules depends on factors other than the color of the latex. As an example, we mention here the latex of the clone Tj. 1, which is very yellow, whereas the amount of yellow fraction is only about 22% of the total volume. On the other hand we have Glenshiel I, not being extremely yellow, but having a yellow fraction of 34% by volume."

The solution of this problem lies in the fact that the yellow color of a given latex is not determined by the amount of viscoid fraction, but by two other factors, viz.: the number of Frey-Wyssling globules, and the color intensity of these globules, i.e., the concentration of carotenoid substances dissolved therein. Whereas, for instance in BD. 5 latex, well known for yielding a very light-colored crepe, the Frey-Wyssling globules are very pale yellow and therefore hardly detectable under the microscope; in War. 4 latex many globules can be seen bright yellow or orange colored. As most of these globules are embedded in the viscoids, an underlayer of BD. 5 latex often appears greyish-white with only very pale yellow streaks or spots; whereas an underlayer of War. 4 latex is usually bright yellow or orange, mottled, in streaks, or in a definite top zone, as the case may be.

With regard to the color distribution we have to bear in mind that the viscoids themselves are built up of a great number of small "units" and disintegrate easily under certain circumstances, for instance, under slight pressure. Consequently during the process of centrifuging the viscoids disintegrate to a certain extent, setting free part of the Frey-Wyssling globules, which in their turn are thrown out and apparently move down more slowly than the viscoids to form the colored top zone, or penetrate the underlayer, depending on the time of centrifuging and slight differences in physicochemical characteristics of globules and viscoids. If some globules, owing to their particle size and density tend to cream rather than to settle down, they remain in the white fraction during centrifuging and form a yellow surface layer on that fraction on standing, which was noticed especially in sulfite treated latices.

Prevention of Crepe Darkening

So it seems that part of the problem of producing a white latex or crepe is a complete removal of the Frey-Wyssling globules. But as it is well known that even the best prepared crepe tends to darken on aging, the next thing will be to keep it white. A phenomenon observed in the course of our experiments on fractionation by centrifuging may throw some light on this side of the problem.

In most cases the viscoid fraction of untreated centrifuged latex coagulates very rapidly; whereas the white fraction remains liquid. Hence within 30-60 minutes after centrifuging the white fraction can easily be poured off and kept separately. The viscoid fraction can then be put on a piece of filter paper and kept for 24 hours. In that time, often even after a few hours, the surface of the viscoid fraction, whether it was bright yellow, orange, or nearly colorless, turned dark-brown or nearly black. Cutting the viscoid coagulum in slices showed that only the surface had discolored, indicating that some substance, present in the viscoid complex and originally colorless, had turned brown to black on exposure to air, i.e., by oxidation. This discoloration did not occur in the white fraction of the same latices, which, either as coagulum or in the liquid state, remained white. It therefore appears that this substance is a part of the viscoid complex.

Now it is well known that in *Hevea* latex an oxidizing enzyme is present, and the darkening of rubber is traced to the action of that enzyme. Gorter (8) supposed tyrosinase to cause the discoloration in coagulum and rubber, which point was further proved by De Jong (9). Hence starting from tyrosine and or dihydroxy-phenylalanine, both of these amino acids being present in fresh latex (10), tyrosinase produces melanin-like substances, products of a brownish-black color, of which the chemical composition is still unknown (11).

It now appears from our experiments that both tyrosine and/or dihydroxy-phenylalanine and tyrosinase after centrifuging fresh latex occur in the underlayer, i.e., form part of the viscoid-complex.

This, however, is not the whole story. It is well known that the surface of some latices, in particular War. 4 latex, tends to darken very rapidly; while others do not. For example, in keeping an unpreserved BD. 5 latex for 24 hours the surface of the coagulum will stay white; whereas the surface of a coagulum from War. 4 latex often will turn black in the same time. As both viscoid fractions of BD. 5 and War. 4 centrifuged latex turn black, BD. 5 latex must contain a natural antioxidant which inhibits the conversion of tyrosine into melanin by air-oxidation.

When the coagulated viscoid fraction is exposed to air, it always turns brownish-black, as said before. It was found, however, that addition of sulfite to the latex before centrifuging acts the same way as the natural occurring antioxidant, i.e., it inhibits the conversion of tyrosine into melanin, to a large extent at a concentration of 0.15% and completely at a concentration of 0.25%. The role of sulfite in crepe processing is therefore characterized by its inhibiting action on the oxidation of tyrosine, i.e., by preventing crepe to darken in air, rather than by its "bleaching" action on the yellow pigment, as already mentioned by De Vries (12).

Influence of Ammonia

The behavior of ammoniated latex on centrifuging in a batch centrifuge and the microscopy of that latex were investigated by De Haan-Homans and van Gils. However their description of the phenomena observed does not seem very consistent. In their first publication (1a) they state that:

"In old ammoniated latex the yellow fraction is no longer present. This is easily understood by observing under the microscope the picture which appears when alkali diffuses into fresh latex; the transparent viscous islands dissolve. Sometimes, however, the viscous matter is more resistant and in exceptional cases it was still present in ammoniated latex several weeks old."

In (1b) it is said that:

"When ammoniated latex was centrifuged in a tube, no separation of yellow particles took place . . . by allowing a drop of ammonia to diffuse in the latex under the cover glass it was observed that the lutoids slowly dissolve . . . when a considerable amount of ammonia is added (e.g., to above pH 9) this separation into two fractions does not occur."

In the following publication (4) van Gils claims that:

"When freshly ammoniated latex is left standing for some days, a sludge is formed consisting of crystals of magnesium ammonium phosphate. In most cases, however, above this layer some yellowish or greyish streaks are to be seen more or less distinct, sometimes very small and sometimes a few centimeters high, but without a clear sharp boundary. When centrifuging ammoniated latex in tubes the same phenomena are to be seen."

But in that same publication it is said that:

"When alkali (e.g., ammonia) is added to the latex, the lutoids dissolve for the greater part. Only remnants remain which are hardly discernible and dissolve further on keeping the latex with ammonia."

From these various statements it is not quite clear what exactly happens to the viscoids on adding ammonia to fresh latex, and it was thought worthwhile to extend our centrifuging experiments to ammoniated latex. As mentioned in Table 3, three different concentrations were used (0.25%, 0.49%, and 0.96%) and samples of these latices were run together with a control sample for 30 minutes at 2,000 rpm.

The data in Table 3 show that in all cases ammoniated latex could be fractionated into two layers. 0.25% NH_3 had no influence on the volume of the viscoid fraction in AV. 152, Tj. 1, and War. 4 latex and caused a slight decrease in volume in BD. 5 and PB. 186 latex. 0.49% NH_3 brought a further decrease in volume in BD. 5 and AV. 49 latex; whereas with 0.96% NH_3 in all cases the viscoid volume was decreased considerably, ranging from 5% for Tj. 1 latex to 35% for BD. 5 latex. AV. 49 latex was centrifuged about seven hours after tapping, and the same phenomena could be seen as described before; during centrifuging partial coagulation set in, which caused a reversal of the color of upper and underlayer and made it impossible to determine the volume of viscoid fraction. Although with 0.25% and 0.49% NH_3 a normal volume of viscoids could be separated, with 0.96% NH_3 only a very small amount of viscoids settled at the bottom of the tube.

TABLE 3. INFLUENCE OF AMMONIA ON FRACTIONATION OF LATEX BY CENTRIFUGING

I – untreated latex
II – 100 ml. latex + 1 ml. NH_4OH-sol. 25% (c – 0.25%)
III – 100 ml. latex + 2 ml. NH_4OH-sol. 25% (c – 0.49%)
IV – 100 ml. latex + 4 ml. NH_4OH-sol. 25% (c – 0.96%)

Runs of 50 milliliters each.

	BD. 5 Ml.	AV. 152 Ml.	AV. 49 Ml.	Tj.1 Ml.	PB. 186 Ml.	War. 4 Ml.
	Volume Underlayer (30' 2,000 Rpm.)					
I	7.7	10.2	....	10.5	8.0	9.0
II	6.6	10.2	10.5	10.5	6.5	9.0
III	6.0	10.2	10.0	10.5	6.5	9.0
IV	5.0	8.0	0.3	10.0	5.8	8.0

Comparing the data from Tables 2 and 3 it can be seen that the decrease in viscoid volume caused by ammonia lies in the same range as that caused by sulfite; it is also clear that ammonia does not dissolve the viscoids. What then happens? Here again careful observation of the microscopic image gives the answer. As said before, in untreated fresh latex the viscoids can be observed under the microscope as irregularly shaped islands in an ocean of rubber particles, sometimes small and fairly evenly distributed over the whole picture, sometimes as a mixture of small and large complexes, depending on the clone and the time of observation after tapping. Addition of ammonia changes that picture entirely. Even immediately after the addition no more islands can be observed, except a few remnants, which often have the form of starfishes. When this latex is allowed to stand for a few days or is centrifuged, the viscoid fraction settles, separated from the white fraction by a sharp boundary.

The microscopic picture of this white fraction then shows a homogeneous field of rubber particles and often a certain amount of very fine viscoids, evenly distributed throughout the latex. But stirring upper and underlayer vigorously and then looking at a drop under the microscope at a magnification of 430x or even better 970x, show that the viscoids have disintegrated into very small "units," somewhat bigger than the rubber particles which, because they are colorless and have vague boundaries, are hardly discernible in the stationary picture, but can clearly be seen when the latex is moving. It was further noticed that these "units" are not globules, but have edges more or less undulating. In comparing the pictures of uncentrifuged ammoniated latex and viscoid-free latex, e.g., concentrate, under low magnifications a characteristic difference between them is the "spottiness" of the ammoniated latex picture which the concentrate picture does not show.

Consequently it can be concluded that ammonia disintegrates the viscoids into small "units" which for the greater part are thrown out when centrifuged in a tube. This point also explains three other observed phenomena concerning color distribution, viz., (a) that in ammo-

niated latex the color is evenly distributed throughout the underlayer; (b) that in several cases at the bottom of the tube a small greyish-white layer could be observed; and (c) that the Frey-Wyssling globules had concentrated on top of that "bottom" layer instead of on top of the whole viscoid fraction.

Although ammonia distintegrates the viscoids almost entirely, in some cases remnants remain which settle first (the "bottom" layer). It is also clear that by disintegration of the viscoids the embedded Frey-Wyssling globules are set free, yielding a latex which is a homogeneous mixture of rubber particles, viscoid units and Frey-Wyssling globules. When this latex is centrifuged, the mixture of viscoid units and Frey-Wyssling globules may separate homogeneously, which action accounts for the even color of the underlayer. Or the mixture may separate into two different layers, in which the Frey-Wyssling globules, apparently being in that case somewhat heavier than the viscoid units, are first thrown out, but only after the much bigger remnants of the original viscoids; these remnants form the "bottom" layer.

As in the case of sulfite treated latex, the decrease in volume of the viscoid fraction can be accounted for partly by incomplete separation and partly by a different packing volume of the viscoid units, as compared with the volume of the original viscoids.

Influence of Formaldehyde

As far as is known, no data are available on the influence of formaldehyde on the fractionation of fresh latex by centrifuging. The experiments were carried out as described before with three different HCHO-concentrations: 0.05%, 0.10%, and 0.19%. The data are given in Table 4. After the first run of five minutes the influence of formaldehyde on the volume of the viscoid fraction varies greatly. Whereas it reduces the volume in BD. 5 and War. 4 latex considerably and inhibits the visible fractionation in AV. 49 latex entirely, it augments the volume in Tj. 1 and PB. 186 latex. However after a normal time of centrifuging (35 minutes) the effect in all cases is the same, in that it augments the volume from 0% for BD. 5 latex (for the highest concentration) to 70% for Tj. 1 latex. It is clear from Table 4 that formaldehyde has a twofold effect: (a) it slows down the separation of viscoids, but (b) it increases the volume. This increase for the greater part may be attributed to an increase in packing volume or to swelling of the individual particles, but microscopic observations of the white fraction of these formaldehyde treated latices showed practically no viscoids. It may therefore be concluded that formaldehyde, even in low concentrations, is very effective in separating the viscoid fraction from latex. This also included a very effective separation of Frey-Wyssling globules, as shown by the pure white color of the upper layers and by the fact that in the upper layer of the control sample the surface often turned yellow, caused by creaming of the globules which were not thrown out by centrifuging; whereas the surface of the upper layer of formaldehyde treated latices remained white.

In general it can be said that in formaldehyde treated latices the characteristics of the viscoid fraction are a sharp boundary and a well-defined colored top zone or clear yellow streaks or spots. It was further noticed that often during centrifuging the viscoid fraction coagulated, coupled with a considerable shrinkage of the underlayer.

As far as the tyrosinase activity in the whole latex and in the viscoid fraction is concerned, it can be said that formaldehyde in increasing concentrations hampers the oxidative darkening of the latex or underlayer, but up to the highest concentration used (0.19%) fails to prevent it completely as does sulfite.

TABLE 4. INFLUENCE OF FORMALDEHYDE ON FRACTIONATION OF LATEX BY CENTRIFUGING

I — untreated latex
II — 100 ml. latex + 1 ml. HCHO-sol. 5% (c = 0.05%)
III — 100 ml. latex + 2 ml. HCHO-sol. 5% (c = 0.10%)
IV — 100 ml. latex + 4 ml. HCHO-sol. 5% (c = 0.19%)

Runs of 50 milliliters each.

	BD. 5 Mi.	AV. 152 Mi.	AV. 49 Mi.	Tj. 1 Mi.	PB. 186 Mi.	War. 4 Mi.
Volume Underlayer after First Run (5'/2,000 Rpm.)						
I	8.0	?	9.5	4.2	5.8	10.8
II	5.5	?	?	6.0	7.5	8.5
III	4.5	?	?	6.6	9.5	8.2
IV	4.0	?	?	6.8	9.5	?
Volume Underlayer after Second Run (15'/2,000 Rpm.)						
I	7.0	7.0	10.0	4.2	6.4	10.0
II	7.0	7.2	12.4	6.2	7.0	8.7
III	6.5	9.0	13.0	6.8	7.5	9.0
IV	6.5	9.7	14.0	6.8	7.5	10.2
Volume Underlayer after Third Run (15'/2,000 Rpm.)						
I	6.8	7.2	10.0	4.0	6.5	9.5
II	7.5	9.1	13.0	6.2	7.5	10.2
III	7.2	10.4	13.5	6.8	7.5	10.2
IV	6.8	10.4	15.0	6.8	7.5	10.2

Season and Clonal Variations

All the experiments were carried out during the months of January and February, i.e., during wintering, which began early in January. By the end of February most clones were refoliating. During this period very dry weather was experienced. Rainfall was 0.0-inch in January and 2.32 inches in February.

The number of experiments is too small to permit any definite conclusion, but when the figures found for the viscoid fraction of untreated latex are arranged with regard to the date of the experiment and the clones concerned, it seems that seasonal influence on the percentage of viscoids is inconsiderable. On the other hand there are marked clonal differences apart from rather wide variations within the given clones. Table 5 gives the mean value of the percentages of viscoids found for the clones under investigation:

TABLE 5. MEAN VALUE OF % VISCOIDS FOR DIFFERENT CLONES

Clone	% Viscoids
PB. 186	15.0
AV. 152	16.0
BD. 5	16.5
AV. 49	18.8
War. 4	20.6
Tj. 1	23.8

Summary

The object of this study was to determine the influence of the addition of distilled water, sodium sulfite, ammonia, and formaldehyde on the fractionation of undiluted fresh *Hevea* latex by centrifuging.

Latex was used from six different clones, BD. 5, AV. 49, AV. 152, Tj. 1, PB. 186, and War. 4, and centrifuged in tubes for five, 20, and 35 minutes, respectively. The volume of underlayer was then determined; color and color distribution were noted, and microscopic observations of whole latex and upper layer were made. Since it was found that the yellow color of the viscous material occurring in fresh latex as a separate phase, and called "lutoids" by De Haan-Homans and van Gils, is not an intrinsic property of that material, the name "lutoids" is considered inappropriate, and the name "viscoids" proposed instead.

It was further found that the tyrosine-tyrosinase system, responsible for the oxidative darkening of some latices (or crepes) by exposure to air, forms part of the viscoid complex.

(*Continued on page 644*)

The New Belting Plant of The B. F. Goodrich Co. at Akron, O.

William L. Smith[1]

ABOUT two years ago The B. F. Goodrich Co. production engineers began the shakedown run of the world's newest plant for making rubber belting. The $5,000,000 cement and steel structure housed machines and equipment unlike anything else in the industry. Getting production under way would finally test these new machines and processing ideas which had stemmed from nearly half a century of company experience as one of the world's largest producers of belting of all types.

Industry's challenge for bigger and better belts, capable of ever-more strenuous jobs, became the reason for the plant's existence. The new plant was the rubber company's answer to new demands received from the nation's mines, quarries, and general industry—jobs which involved greater tonnage capacity of belts, resulting in increased working stresses—jobs which often were "impossible," judged by belting standards of the day.

The new Goodrich belt plant in Akron was aimed at providing the most modern production methods for making belts which would do the new, tougher jobs industry had assigned them. Most needed to accomplish this objective was new quality control equipment which would keep precise check on production at all stages of the manufacturing process.

Today, nearly 2,000 miles of belting later, levels of uniformly high product quality and production economies never before possible have been reached at the new plant.

This new plant enables the company to make larger conveyor belts for use on higher lifts and longer single flights and for handling heavier loads and harder impacts than heretofore. Conveyor belts can be produced in single rolls weighing up to 35 tons and measuring 16 feet in diameter, or as large as existing rail and truck facilities can handle.

From this plant, erected only a few feet from the site of the original little plant built by Dr. Benjamin Franklin Goodrich in 1870, has since come one of the largest conveyor belts ever built and shipped in a single roll. New belting constructions, including steel cord conveyor belt together with a patented method for splicing,

[1] Technical superintendent, industrial products manufacturing, B. F. Goodrich Co., Akron, O.

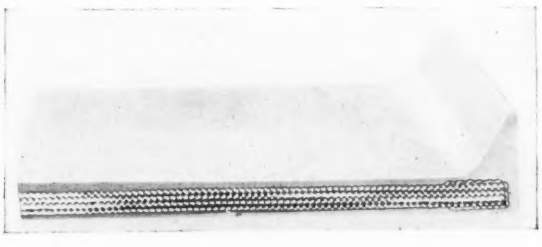

Fig. 1. B. F. Goodrich Co. Flanged Belt

Fig. 2. Surface of Griptop Belt Showing Rubber Fingers

have already been developed here and field tested to meet any present or future need of use at working stresses up to 3,000 pounds per inch of belt width.

Products Made

Belt products made in the new plant include conveyor, elevator, flat, and V-type transmission belting.

Some variations of these basic products are special belts for handling hot materials up to 350° F; oil-resisting and oilproof belts; food-handling belts made with non-taste, non-toxic rubber compounds; static conducting conveyor and transmission belts; Griptop package conveyor belts; steel cord conveyor and steel grommet V-belts; glass fabric belts; conveyor belts compounded to permit magnetic force to penetrate the rubber; and flanged conveyor belts.

Goodrich flanged belts are recommended for handling food products, cans, and packages that tend to slip, roll, or run off the belt. The flanged edge shown in Figure 1 holds materials on the belt. Material being conveyed makes no contact with sideboards, and there is no seepage of liquid over the edge of the belt to the underside.

The Griptop package conveyor belts are designed for moving packages and other materials up and down inclines up to 30 degrees (depending upon size and weight of material) without slipping or rolling, as in loading luggage into planes at airports. The top cover surface of the Griptop belt has approximately 1,500 rubber "fingers" per square foot that grip and move packages at high speed (See Figure 2.)

Plant Equipment

Among the features of the new plant are a $300,000 press for vulcanizing the belts, newest equipment for making steel cord conveyor belts, a humidity controlled factory for manufacturing V-belts, a belt-handling table especially designed with tension control devices, a new $235,000 rotary press for continuous production of transmission belting, and a materials handling system for speedy delivery of raw materials to the production department.

Materials Handling

The physical layout of the plant is a materials handling expert's dream come true. (See Figure 3 flow chart.) Quick, easy movement of materials before, during, and after manufacture is second in importance only

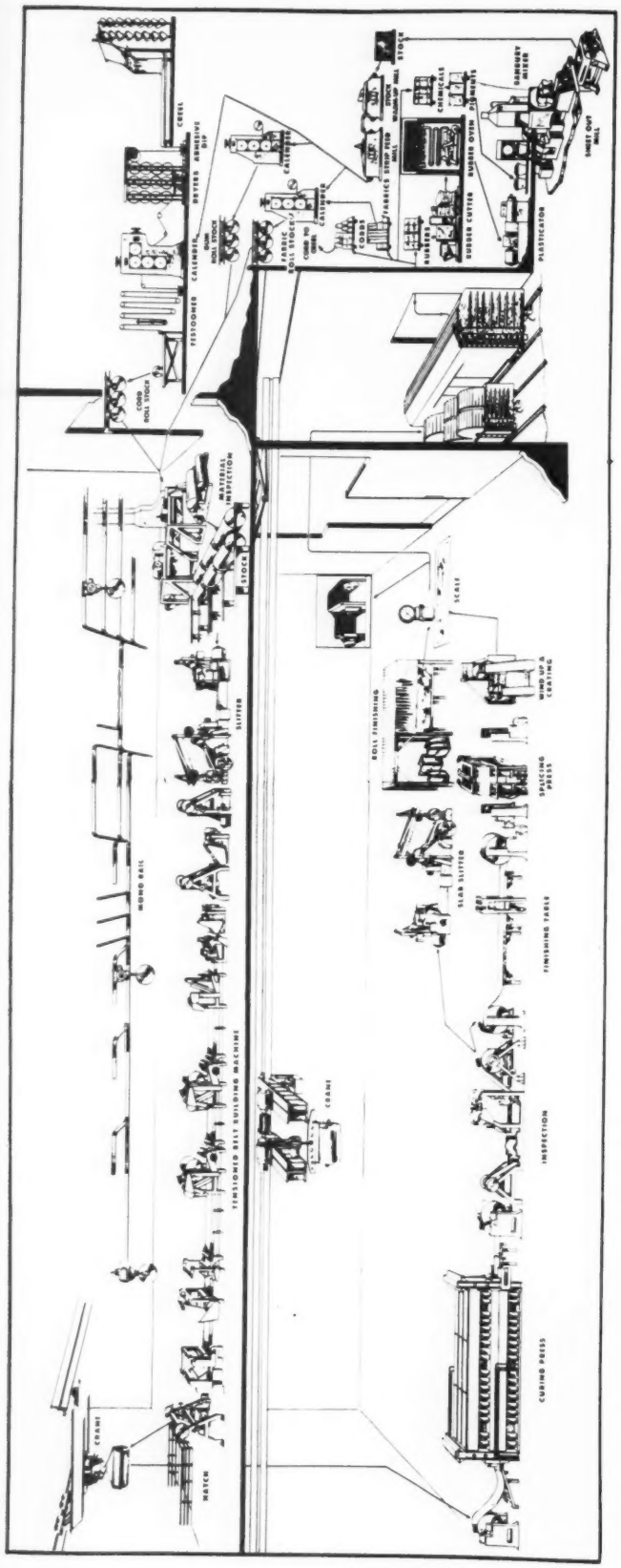

Fig. 3. Flow Diagram for New Goodrich Belt Plant

to new quality control equipment, which latter item includes a material inspection machine, special storage system, tensioned belt building machine, and curing press, described in somewhat more detail later.

Design of the building is patterned entirely around the most efficient flow of materials. A monorail system serves the upper floor of the two-story plant and a system of three overhead cranes for the main floor assures complete handling coverage. Belts get heavier and larger as they move along from one stage in production to another, and the handling equipment gets stronger to match the increased load at each point.

Handling of fabrics is an important function of the materials handling system since thousands of tons of fabric are used each year as internal reinforcement for rubber belts. Fabrics are the belt muscles. The design strengths of belts are determined by types of material handled, length and slope of the conveyor, whether weight is to be raised or lowered, and the weight of the belts themselves.

In most cases the reinforcement is in the form of 24- to 48-ounce duck. Some conveyor belts have as many as 12 plies, but most range from three to nine. Duck fabrics may be made up of either natural or synthetic fibers. Parallel strands of cord, either natural or synthetic, or made of glass or steel, are often used today to reinforce belts designed for special applications.

A two-ton hoist unloads fabric rolls at the second-story level of the new belt building. The rolls are received on industrial trucks routed from the calender room in an adjoining building, where the fabric has been friction and or skim coated with rubber compound. Once the material is set down here, hoists, monorail, and crane systems take over. The material never has to be trucked again.

No less important than the fabric tension member of belts is the compounding of special rubbers used in covers and friction coats of various kinds of belts. Rubber stock is mixed in a Banbury in the mill room. From the Banbury the stock moves to a friction calender or a regular sheet gum calender. Here covers are calendered, and frictioned duck receives a skim coat.

Belting Fabric Inspection and Storage

Once the calendered fabric makes its appearance on the second floor of the new belt plant, it receives a final inspection before being used for building the belts. An inspection machine, developed by Goodrich engineers and believed to be the only one of its kind in the industry, features a continuous thickness gage which measures the overall thickness of the fabric. Electric-eye controls guide the fabric as it is rewound. Inspection of both sides of the fabric during a single pass is possible.

From the inspection machine the 1,000-foot fabric rolls, weighing about 1,000 pounds each, go to storage racks. These racks permit horizontal suspension of the fabric rolls to prevent crushing and distortion of fabric edges, maintain liners in good condition, and facilitate handling by means of the overhead monorail system. The horizontal suspension system requires four times as much storage space as that needed for storing rolls standing on end.

A slitter machine, adjacent to the fabric stock storage area, uses rotary knives to slit fabric into required width. Fabrics up to 80 inches in width can be handled on this equipment. Static discharge brushes are provided to permit safe operation. An electric-eye guiding device provides straight and uniform cuts throughout the length of the fabric roll. All fabric necessary to build a given belt is identified and stored in one position to speed the work of the belt-building crews.

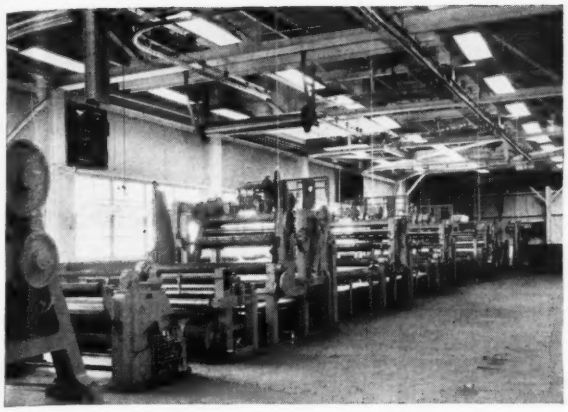

Fig. 4. Goodrich Tensioned Belt-Building Machine

Tensioned Belt-Building Machine

In building a belt the plies must be laid under even tension. Any loose plies will just go along for the ride and overload those plies that are carrying the load. With proper tensioning, the stretch characteristic in the finished product becomes uniform and predictable.

The largest of several tensioned belt-building machines in the new plant extends 130 feet and is nine feet wide. Developed by Goodrich company engineers at a cost of $175,000, the machine is believed to be the only one of its kind in the world. The machine is provided with constant tension let-offs and permits the building of three plies at a time, all under controlled and uniform ply tension. (See Figure 4.) This reduces the number of passes required to build a belt and results in a more uniform carcass structure where each ply of belt will carry its equal of the load in service. Ordinary belt-building machines have no tension controls and can only apply one ply at a time.

The largest tensioned belt-building machine handles a belt roll up to a diameter of 13 feet, width of 72 inches, and weight of 50,000 pounds. Pricking and dusting equipment is incorporated as a part of the machine so that no additional handling of the belt is necessary before vulcanization. Additional building machines are provided for smaller-size conveyor belts, folded-type transmission belts, and endless loop built belts. Endless belts can be made up to 160 feet in length and 60 inches in width.

A modern, streamlined, auxiliary curing unit, using infrared radiant heat, cures the edges of belts which later are press-cured without the use of edge irons. Following tnis operation, the uncured belts can be stored in a nearby area until they are transferred to the press room for vulcanization. Storing "green" belts in the cool preparation room area reduces many curing defects, resulting in improved quality in the finished belt. Horizontal suspension of the belt rolls is used in this storage area also to prevent distortion and maintain cleanliness.

Belt Curing Room

Transfer of rolls of belting to the press or curing room is made through hatches in the west end of the belt preparation room. A 25-ton crane delivers the belt rolls to a point near the press let-offs, where they are suspended until ready for vulcanization. Here, again, the larger, heavier rolls are suspended horizontally.

The new No. 100 curing press of 4,000 tons capacity, which together with auxiliary equipment represents an investment of $300,000, weighs 332 tons and is believed to be the largest of this type ever built. This press has an overall length of more than 50 feet, width of nearly 13 feet, is 14 feet 7½ inches above the floor, and extends nearly six feet below the operating floor. (See Figure 5.)

The press has 36, 12-inch diameter rams designed to operate on 2,000 psi. hydraulic pressure, which will develop a total press pressure of 4,000 tons. The press platen area is 76 inches by 37½ feet.

Other features of this giant press include independently operated and controlled stretcher clamps which provide more versatility in press operation. Mechanical equalizers maintain a parallel condition of the press platens as the press closes. This arrangement insures simultaneous contact over the entire curing surface and eliminates "skidding" of the gum cover on conveyor belts. With the improved hydraulic system, the press closes faster, eliminating belt blisters created by excessive heating without pressure.

A battery of other presses placed parallel with the No. 100 press in the curing room may also be used for curing conveyor, elevator, and transmission belting. These presses are equipped with electrically operated pusher-type edge irons for use in curing such belts. Curing pressures and temperatures are automatically controlled and recorded. Push-putton controls for more efficient operation are added features. Automatic timers are provided to aid the operators in maintaining the correct curing cycle. Each press is provided with a wind-up and let-off at opposite ends to make it easier to handle the belt during vulcanization.

After curing, belts go to the inspection table. Any minor finishing needed, as detected at inspection is done at the finishing tables.

Belt Splicing and Cutting

After the belt is cured, it may be necessary to splice two lengths together in order to make one roll to meet the customer's needs. This operation is done at a splicing press where the ends of the belt are joined and vulcanized together. The new double-decked press in use at the Goodrich plant for this purpose is especially designed for curing conveyor belt splices. It is equipped with stabilizers to insure equal pressure over the entire platen area. The platens of this press are 84 inches wide, large enough to cure any belt splice.

Slabs of cured belting are cut to specified widths on the cured belt slitting machine. The equipment is so designed that inspection of both sides of the belt can be made at the same time. The rolls of belting are rolled tightly on shells and can be wrapped for shipment on this machine.

Fig. 5. No. 100 Belt Curing Press of 4,000-Ton Capacity

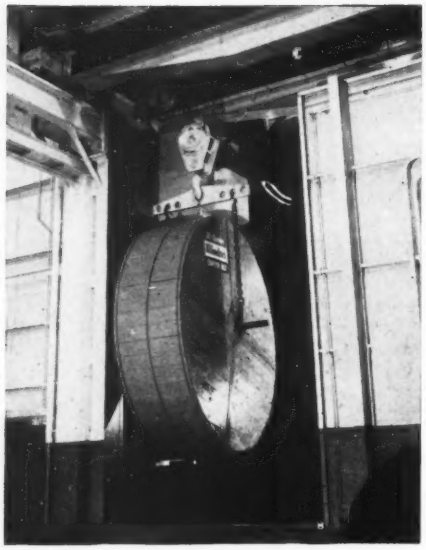

Fig. 6. "T" Shaped Shipping Door Which Permits Crane to Maneuver Out of Plant and Over Rail Siding

Warehousing and Shipping

Finished belts may be warehoused in an area comprising 12,000 square feet. The warehouse shipping center is equipped with tables and wind-ups able to handle the largest-size belts carried in warehouse stock.

Feature of the handling system for finished belts is the "T" shaped shipping door to the rail siding. (See Figure 6.) The top section of the door is designed to swing upward, thus permitting the 35-ton crane to pass out and over the rail siding. In this manner belts can be loaded directly from the belt plant into the railroad cars without secondary handling.

The truck shipping dock is equipped with a hydraulic leveling device to adjust the height of the truck body with that of the platform.

Fractionation of Latex

(*Continued from page* 640)

Regarding the effect of dilution and of the addition of preservatives, it was found that although the addition of water influenced the volume of underlayer in all cases, there are marked clonal differences: War. 4 and Tj. 1 latex are the most stable; BD. 5 and PB. 186 latex take a middle position, and AV. 152 and AV. 49 latex are the most sensitive.

Addition of sulfite causes a decrease in the volume of underlayer, partly because it hampers the complete removal of small sized viscoids and of Frey-Wyssling globules from the white fraction and partly by a decrease of the packing volume.

Addition of ammonia, supposed to dissolve the viscoids according to De Haan-Homans and van Gils, did not prevent the latices under investigation from fractionating, but as a rule decreased the viscoid volume in the same way as did sulfite. Microscopic studies made it clear that ammonia disintegrates the viscoids into very small units and sets free the Frey-Wyssling globules embedded in the viscoid complex. On that basis certain color phenomena in the viscoid fraction of ammoniated latex could be explained.

Formaldehyde has a twofold effect on fractionation: it slows down the separation of viscoids, but it increases the volume. It can be said that formaldehyde, even in low concentrations, is very effective in separating the viscoid fraction from latex. This also includes the separation of Frey-Wyssling globules.

In conclusion, seasonal and clonal influence on the amount of viscoid volume in untreated latices is discussed.

Acknowledgments

The author is indebted to K. G. McIndoe and G. A. Kidder for their active interest in this investigation and to the Firestone Plantations Co. for the opportunity to carry out and the permission to publish this work.

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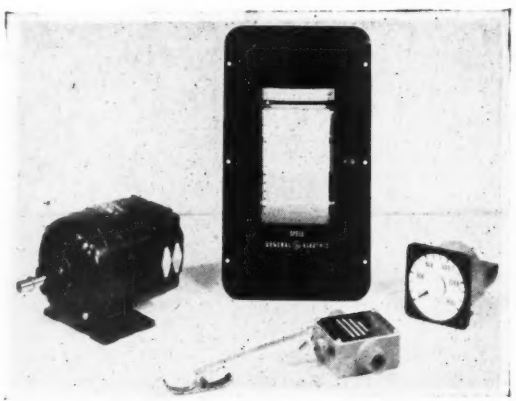
Tachometer Kits

NEW tachometer kits containing all the components necessary to provide instantaneous and permanent records of machine performance at a central location are now available from General Electric Co., Schenectady 5, N. Y. Particularly suited for use in the continuous process industries, such as rubber, textile, paper, etc., the kits contain a d. c. tachometer generator, a tachometer indicator, a switchboard-type tachometer recorder, and a web-break detector. In applications where web-break detection is not required, the detector can be omitted without impairing the usefulness of the tachometer-recorder combination. Audible or visual alarm systems connected to the detector, and other accessories such as special two-pen recorders can be supplied with the kits.



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Editorials

Rubber Industry Survey Indicates 15% Plastics Use in 1962

DURING June and July, India RUBBER WORLD made a survey of a portion of the rubber industry in an attempt to determine the present use of its three major raw materials, i.e., natural rubber, synthetic rubber, and plastics, and to determine what the proportions of each of these materials would be 10 years from now. Previously published information along these lines did not specifically answer two important questions:

1. "What will be the approximate percentage of the total (100%) for each of these materials in 1952?"

2. "What will be the approximate percentage of the total for each of these materials in 1962?"

Questionnaires were sent to a select list of 330 companies, mostly in the mechanical goods branch of the industry, and replies have been received to date from 90 companies. We hope that many of the remaining 240 companies or any others willing to answer the above two questions will still send in their estimates. A tabulation and analysis of the 90 replies, however, reveals the following information of interest.

For 1952 it was estimated that natural rubber would be used to the extent of 39.7%, synthetic rubber—54.8%, and plastics—5.5%. For 1962, the estimates were: natural rubber—31.8%, synthetic rubber—57.4%, and plastics—10.8%. The total number of employes represented here was 200,722.

If, however, the three large companies' figures with about 165,000 employes were excluded, and the figures analyzed for the remaining medium sized companies with 34,722 employes, natural rubber use in 1952 was estimated at 35.6%, synthetic rubber at 55.4%, and plastics at 9.0%. On the same basis in 1962, natural rubber use was estimated at 31.2%, synthetic rubber at 54.0%, and plastics at 14.8%.

Apparently, if this small sample can be considered reasonably representative, plastics use in the rubber industry in 1962 will be somewhat less than some had anticipated. Natural and synthetic rubber use are expected to remain the same.

"Technical Manpower in the Future"

THE President's Materials Policy Commission report was made public on June 23, and the July issue of India RUBBER WORLD contained a reprint of the chapter on rubber as well as other items of interest on tires, stockpiling, etc.

Volume 1 of the report in Chapters 23 through 26 deals with the subject, "Technology: Resource for the Future," and Chapter 25 is of special interest since it discusses "Government and Materials Research" and shows that our facilities for adequate research both by government and industry are not enough for future needs. The problem of technical manpower, which has been covered previously in this column, is emphasized as being extremely serious.

Reference is made to the Engineering Manpower Commission of the Engineer's Joint Council which estimated that in 1951 there was a need of 80,000 engineering graduates; only 41,000 engineers finished their schooling that year, and many of these were susceptible to being drafted into military service.

A chart is presented for the number of engineering and science graduates (four-year courses) for the years 1948 through 1952 and is estimated through 1955. A sharp decline is noted from 1950 on, and the Commission comments further, as follows:

"Moreover, the figures given above take no account of the operations of Selective Service, which may not only reduce the college population, but withdraw graduates from their professions for the unpredictable length of their military service. Only on the assumption that war and the draft do not completely alter the prospects for college trained men will the number of engineering and science graduates begin to rise again by 1955; only in that case will the number of graduates return to a more adequate level by the early 1960's. Numbers with advanced degrees would not increase until several years later."

Under existing conditions in this country and abroad, how can we assume that war and the draft will not alter the prospects for college trained men? Young graduates are being taken by the draft daily, and the already insufficient number is further depleted. It is not an overstatement to say that the future security and economic progress of this country are directly related to the efficient use of technical manpower in the places where it will do the most good.

During the next ten years or until the supply equals the demand, no engineering or science graduate should be drafted into the Armed Services unless he is used in work for which he has been trained. Unless there is a drastic change in the policy of the Selective Service Act, the industrial plant so important to security and progress in both peace and war will be partially immobilized because there will be insufficient trained personnel to man it.

The surveys have been made, and the reports written; the time for action is *now*, if we are to avoid a serious crippling of the industrial plant in this country during the next decade, whether we are at peace or war.

R. G. Seaman

DEPARTMENT OF

PLASTICS TECHNOLOGY

A Study of Plasticizer Migration in Vinyl Compounds[1]

James R. Geenty[2]

PLASTICIZER migration in vinyl compounds may be defined as the gradual diffusion of plasticizer from an area of given plasticizer concentration to an area of lower plasticizer concentration. The rate of migration is important in many uses of vinyl resin, particularly in upholstery where fast migration will cause stiffening of the plastic by passage of the plasticizer into clothing and may result in enough plasticizer loss to cause cracking. In any other use where plasticizer may be wiped or otherwise removed from the plastic surface, plasticizer migration is also important.

Plasticizer migration rate could be measured by continually removing plasticizer from the surface of a vinyl film of standard thickness under controlled conditions and determining the rate of plasticizer loss, but no such reliable analytical method has been available, and too little accurate information has been obtained on this important subject.

History of Migration Tests

Various methods for studying plasticizer migration have been proposed and used. One is to place a film of the compound to be tested on a lacquered surface and to note the time required to soften, wrinkle, or otherwise affect the lacquer. This method is not satisfactory as a migration test because it is slow; results, at best, are qualitative rather than quantitative; and it primarily measures solvent action of plasticizers on a particular type of lacquer rather than rate of migration.

Extraction of plasticizer in gasoline has been proposed and used as a migration test, but this, too, is not reliable. It is more a measurement of plasticizer solubility in gasoline than a measurement of migration and is complicated by the fact that gasoline can be absorbed into vinyl film and will swell it, allowing gasoline soluble plasticizers to leach out rapidly. Data presented in this paper show that plasticizers that are nearly all leached out by gasoline will migrate no faster than plasticizers that are nearly gasoline insoluble.

Soaking in oil has also been proposed as a migration test. This method has the same faults as the gasoline soaking procedure, except that the leaching action is slower. Soaking in oil is essentially a test of solubility of the plasticizer in oil rather than a migration test.

Burial in coarse activated carbon was proposed at first as a migration test, but was effective only at elevated temperatures and was found to be a measure of volatility. Some authorities feel that the loss of plasticizer in activated carbon is partially through volatility and partially through diffusion into capillaries of the carbon.

Proposed Test Method

Migration studies were undertaken at Goodall-Sanford several years ago, and the method proposed in this paper, as the culmination of this work, is believed to constitute a true migration test. It has most, if not all, of the desirable characteristics sought in such a test: it gives analytical results; it is fast even at room temperatures (duplicable results significant to two figures are obtained in one day); plasticizer is removed from the vinyl surface by physical absorption alone; so no solvent or leaching action occurs; samples with rough or grained surfaces, such as film stripped from coated fabrics, can be tested accurately; and the test is easy to perform and requires no complicated apparatus.

The procedure consists simply of burying weighed test pieces in a fine, highly absorbent powder under moderate pressure to insure intimate contact. The powder is changed at suitable intervals, and the test sample reweighed to determine weight loss.

The apparatus for the test, as used in this laboratory, is simple to construct and operate. It consists of square tin-can containers with square wood blocks that fit inside the cans, and a lever arm with a pressure plate that will apply a 40-pound load when a 10-pound weight is hung on the end of the arm. The cans were made by squaring round cans of one-half pint capacity and can hold 10 two-inch-square test pieces with the required powder. By the use of blocks, the cans can be tiered three high under pressure, and three sets of tiered cans with weights will fit in a 17- by 17- by 24-inch laboratory oven. Thus it is possible to test 90 samples at one time with such an oven.

The vinyl resin used in making the test compounds was a commercial grade, Vinylite VYNW. The plasticizers used were all commercial products. Premixing and milling of the compounds were done by standard labora-

[1]Presented before the Plastics Film, Sheeting & Coated Fabrics Division, Society of the Plastics Industry, Inc., New York, N. Y., Dec. 13, 1951.
[2]Goodall-Sanford, Inc., Reading, Mass. Work carried out by the late C. M. Grafton.

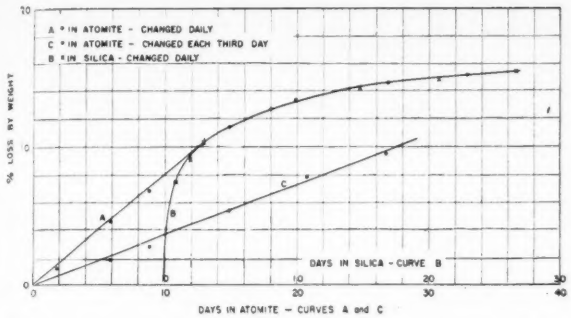
A ° IN ATOMITE - CHANGED DAILY
C ° IN ATOMITE - CHANGED EACH THIRD DAY
B ° IN SILICA - CHANGED DAILY
% LOSS BY WEIGHT
DAYS IN SILICA - CURVE B
DAYS IN ATOMITE - CURVES A and C

Fig. 1. Plasticizer Loss by Migration in Atomite and Silica at 50° C.

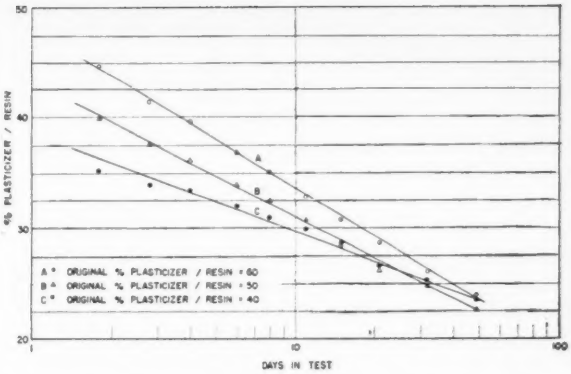
% PLASTICIZER / RESIN
A ° ORIGINAL % PLASTICIZER / RESIN = 60
B ▲ ORIGINAL % PLASTICIZER / RESIN = 50
C ° ORIGINAL % PLASTICIZER / RESIN = 40
DAYS IN TEST

Fig. 2. Migration Loss of Di-2-Ethylhexyl Phthalate in Linde Silica at 50° C.

tory procedures. Milling took place on a 12-inch laboratory mill, using a 10-minute cycle and roll temperatures of 310° F. The milled compounds were cooled to room temperature, remilled, and then sheeted to 0.015-inch thick on a laboratory calender. Pressure in all tests was 10 psi.

The test procedure is as follows: The powder is stirred so that it will flow, and 25 cubic centimeters are placed in the bottom of the can. A test sample is laid on top of the powder, and 25 cubic centimeters more of powder are added on top of the sample. A piece of cellophane is then laid over the powder to act as a plasticizer barrier. The process is repeated until the can is full, after which a 2⅛-inch-square wood block is put on top and pressed down to apply the 10 psi. load. The weighted can is then placed into a controlled temperature oven at 30° C. The powder is changed, and the samples are weighed after one day and three days, and at intervals thereafter, as desired.

The first tests were made at 50° C., but the 30° C. temperature was finally chosen as standard because it is near the temperature of actual summer service, and because its smaller differential above normal room temperature allows the temperature control to function better. The effect of temperature on rate of plasticizer migration is very pronounced; therefore it is essential that temperature be accurately controlled during the test.

Test Considerations

Some possible variables in this test have not been studied. They include the effect of different pressures on the test samples; effect of powder temperature; effect of powder moisture content; and variations between different lots of powder. These variables should be studied if this test is to be accepted as a standard method.

The choice of powder for this test is very important. A number of powders were tested, and, of this number, only two were found to give a true migration test based on concepts hereinafter described. These two powders were Linde silica, a finely divided, precipitated silica made by Linde Air Products Co.; and a hydrated silica sold as silica acid, analytic grade—100 mesh by Mallinkrodt Chemical Co.

Apparently high oil absorption alone does not determine a suitable powder, since several powders having liigh oil absorptions proved entirely unsatisfactory for the test. It is particularly noteworthy that Santocel, a silica of very high oil absorption, was not suitable, whereas Linde silica, which was thought to be very similar in particle size and chemical composition, was ideal for migration test use. The logical conclusion is that the wicking action of plasticizer into the powder surrounding the test piece is an essential factor. If such wicking action does not occur, a high concentration of plasticizer develops at the film surface, and migration of plasticizer from the film to the surface slows down or stops. In other words, plasticizer is not removed from the film surface fast enough or completely enough to give a true migration test.

The powders that were tested and found unsatisfactory included bentonite, carbon black, Santocel, Suprex Clay, Geon 121 vinyl resin, talc, Hi-Sil, Atomite, Si-O-Lite silica, Purecal U, Code 922 Silica Gel, and Pyrax B.

The use of blotters pressed against test pieces and changed frequently was also tried in place of powder. The blotter method gave measurable migration losses, but did not give a true quantitative migration test.

Our concept of true migration measurement conditions is that the plasticizer shall be removed from the surface of the test piece as rapidly as it can migrate to the surface. The concentration of plasticizer on the test surface, therefore, shall be maintained at a very low level, with a resultant gradient of plasticizer concentration between the surfaces and center of the test piece.

There are two indications when this result has been achieved: (1) the rate of plasticizer loss into the powder is not changed by reasonable changes in the interval between powder changes (this condition shows that the limit of the ability of the powder to absorb plasticizer has not been reached); and (2) the curve of plasticizer loss plotted against the logarithm of time is nearly linear. Logarithmic time is used in plotting the curves for convenience; else the time axis would be too long.

Conversely, if the rate of plasticizer loss, as measured, is directly proportional to time when the powder is changed at regular intervals, the plasticizer is not being absorbed by the powder as rapidly as it migrates to the film surface, and the test merely determines how much plasticizer the powder will absorb from a given area in a given time. In this case the rate of loss is increased by making more frequent powder changes, or decreased by making less frequent powder changes.

If a powder is used that will accept plasticizer a little slower than it migrates to the surfaces of the specimen at the start of the test, a straight-line relation of plasticizer and time will be obtained at first. Then, as plasticizer concentration in the specimen decreases and the rate of migration becomes less than the absorptive ability of the powder, the rate of migration will govern the loss measured, and the loss will be in linear relation to the logarithm of time.

The curves in Figure 1 illustrate these points. They show the % loss by weight of plasticizer from vinyl compounds plasticized with a mixture of polymeric and phthalate plasticizers in the ratio of 60 parts plasticizer

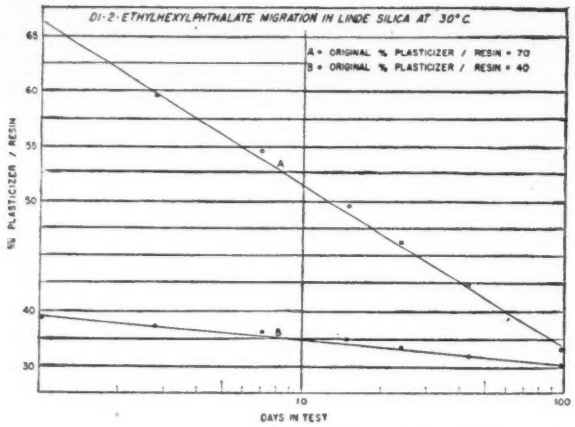
DI-2-ETHYLHEXYLPHTHALATE MIGRATION IN LINDE SILICA AT 30° C.
A = ORIGINAL % PLASTICIZER / RESIN = 70
B = ORIGINAL % PLASTICIZER / RESIN = 40
% PLASTICIZER / RESIN
DAYS IN TEST

Fig. 3. Migration Loss of Di-2-Ethylhexyl Phthalate from Compounds Containing Different Initial Plasticizer Contents; Tested in Linde Silica at 30° C.

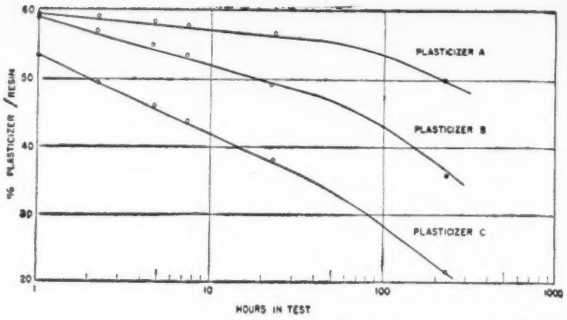

Fig. 4. Migration Losses of Various Plasticizers in Linde Silica at 30° C.

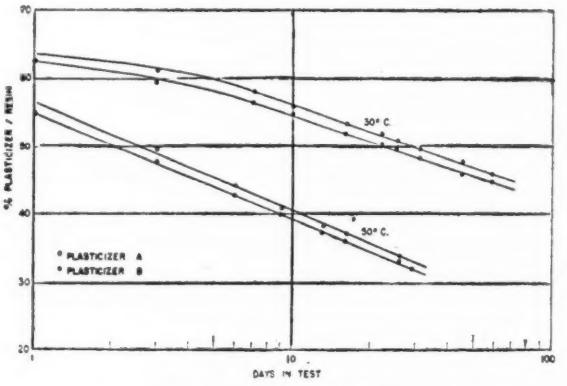

Fig. 5. Effect of Test Temperature on Migration Loss of Two Plasticizers; Tested in Linde Silica at 30 and 50° C.

to 100 parts resin. Curves A and C were made using Atomite (calcium carbonate); while curve B was made using Linde silica. The zero point for curve B has been moved 10 days to the right to show that after three days it corresponds to curve A after 13 days. The point where curve A joins curve B is that at which the Atomite will absorb plasticizer as fast as it can migrate to the specimen surface. Also, curve B is reproducible within experimental error whether the powder is changed daily or every three days. If the Atomite is changed each third day, curve C is produced and shows considerably less plasticizer loss. When curve B is replotted to show % weight loss in relation to the logarithm of time in days, the curve is linear.

To the consumer of vinyl coated fabric or vinyl sheet, the migration problem resolves itself into the question, "What will the physical properties be after the product has undergone a period of migration in service?"

The most important property may be resistance to cracking at room or low temperatures. The test outlined here will serve nicely as the first step in finding the answer to this problem. Cold tests or stiffness tests can be run conveniently on the migration test specimens, and the results compared with those from untreated samples of the same material. In our laboratory the cold test is made by allowing a weight to roll down an inclined plane over a looped sample of definite shape and size, a method that gives accurate and reproducible results.

Migration Test Results

Some data on the behavior of various plasticizers in migration have been obtained. Figure 2 shows the migration characteristics of three compounds containing different original amounts of di-2-ethylhexyl phthalate plasticizer. Curve A started with 60% plasticizer; curve B with 50% plasticizer; and curve C with 40% plasticizer. It is apparent that after 50 days' test at 50° C. all three compounds have nearly equivalent plasticizer contents, approximately 23%.

Figure 3 shows the migration of di-2-ethylhexyl phthalate at 30° C. in two compounds: A, starting with 70% plasticizer content; and B, starting with 40% plasticizer content. It is apparent that both compounds will have nearly the same plasticizer content, approximately 30%, after a little over 100 days in test. Comparing Figures 2 and 3, it appears that vinyl film not only loses plasticizer faster by migration as temperature is increased, but also retains less plasticizer at the higher temperature over a given time interval. Figure 2 results in 23% plasticizer content after 50 days at 50° C.; while Figure 3 shows 30% plasticizer after 100 days at 30° C.

Figure 4 shows the migration rates of three different plasticizers at 30° C., plotting % plasticizer content (based on resin content) against the logarithm of time in hours. All three compounds were originally plasticized with a 60% plasticizer content; Plasticizer A is di-2-ethylhexyl phthalate, and Plasticizers B and C are widely accepted low-temperature plasticizers. It can be seen that the time required for the compounds to decrease from 60 to 50% plasticizer content is approximately 210 hours for A, 21 hours for B, and 2.1 hours for C. This figure illustrates the need of careful selection of plasticizers for low-temperature protection and shows the rapid migration loss that may occur if the selection is poor. The curves also indicate that it may be preferable to use a slow migrating plasticizer of intermediate low-temperature protection, rather than a fast migrating plasticizer of good initial low-temperature protection.

Figure 5 shows the large increase in migration loss as temperature is increased. Of the two plasticizers shown, A is a combination of 70% di-2-ethylhexyl phthalate and 30% chlorinated paraffin; while B is a polymeric plasticizer. Both original compounds contained 67% plasticizer and were about equally soft at room temperature. Both compounds were subjected to migration in Linde silica at 30 and 50° C. The time required for A to drop to 50% plasticizer content was 2.5 days at 50° C. and 29 days at 30° C., a difference of over 11:1. For B, the time relation was two days at 50° C. and 22 days at 30° C., a difference of 11:1.

Another important fact shown in Figure 5 is that polymeric plasticizers are not necessarily non-migrating. In fact, the B plasticizer used (which is a good, widely used polymeric type) migrates a little faster than the combination employed in A. This point also illustrates why gasoline extraction cannot be used as a migration test; the compound containing polymeric B lost only 15% of its plasticizer content upon soaking in gasoline for one hour at room temperature; while the compound containing A lost 98% of its plasticizer content during the same test. Yet plasticizer A actually migrates slower than B in the silica powder migration tests shown.

Summary and Conclusions

We feel that the migration test described in this paper is simple to perform, accurate, practical, and gives reproducible results. Both film or sheeting and coating stripped from fabric can be tested by this method. Data are given on the migration characteristics of various plasticizers. The effect of test temperature is discussed, as is the effect of plasticizer migration on low-temperature flexibility. It is shown that the magic word, polymeric, when applied to plasticizers, does not necessarily mean non-migrating.

ASTM Symposium on Plastics

ONE of the symposia at the fiftieth anniversity meeting of the American Society for Testing Materials held in New York, N. Y., June 23-27, was on "Plastics Testing—Present and Future." Co-chairmen for the symposium were H. K. Nason, Monsanto Chemical Co., and C. R. Stock, American Cyanamid Co.

"The Measurement and Significance of Mechanical Strength Properties of Plastics," by C. Howard Adams, Monsanto, was the first paper on the program. Many types of strength tests are used to characterize plastics materials. Those tests that provide the most significant information, including the comparatively recent and important addition to the field, dynamic or virbrational, were discussed. Most of today's testing is done at loading or straining rates where instrumentation is not a problem. However, the engineering and theoretical nature of plastics is better assessed at the extremes of the testing speed scale. Data were presented illustrating this point.

"Measurement of the Effect of Temperature on Some Physical Properties of Plastics," by J. P. Tordella, A. C. Webber, E. B. Cooper, E. I. du Pont de Nemours & Co., Inc., was the second paper. The temperature range over which the physical properties of plastics are important is from +450 to —100° C., it was said. Two types of tests appear to be required: rapid tests, which often do not provide fundamental data, and whose principal virtue is characterization; and more elaborate tests whose principal purpose is measurement of fundamental properties. Principal emphasis was placed on measurement of stiffness at elevated temperatures, brittleness temperatures, and melt flow. Two rapid techniques for measurement of volume coefficient of expansion were also described.

"Measurement of Color, Gloss, and Haze," by H. K. Hammond, National Bureau of Standards, and G. W. Ingle, Monsanto, was the third paper. The capabilities and limitations of methods of test for color, gloss, and haze were discussed, and adaptions of them described. Some problems associated with the correlation of subjective estimates of these appearance attributes with the objective measurements were discussed.

"Effect of Molding Conditions on Permanence of Plastics," by J. L. Williams and J. W. Mighton, Dow Chemical Co., was the next paper on the program. During their useful life plastic objects are subjected to a wide variety of chemical, thermal, and mechanical conditions, and predictions of their permanence properties are difficult unless consideration is given to the variations caused by the fabrication techniques and testing methods. Even though there are many ASTM methods describing evaluation procedures for permanence and outlining standard methods for fabrication of test specimens, there is need of further work, it was said.

"An Improved Fadeometer," by L. Boor and S. L. Trucker, Philadelphia Quartermaster Depot, U. S. Army, described a weathering apparatus using the Atlas-type enlosed arc as the light source. Temperature and relative humidity of the the air in contact with the specimens are controlled and are variable over a wide range of ambient conditions.

"Prediction of Creep Curves from Stress-Strain Data," by Yoh-Han Pao and Joseph Marin, Pennsylvania State College, developed a method for prediction of tension creep-time relations for constant stresses from tension stress-strain relations at various strain rates. Agreement between actual and predicted creep-time curves was found to be good for Plexiglas.

"Residual Stresses in Compositions of Phenolic Resins," H. M. Quackenbos, Jr., Bakelite Co., Division of Union Carbide & Carbon Corp., was the final paper on the program. The distribution of residual stress in square phenolic bars was determined from the deformations resulting when (a) one face was milled to various depths, (b) holes of increasing diameter were bored longitudinally. With fillers of wood flour and chopped fabric the stresses were under 1,000 psi., except near the surface of the bar, where they reached as high as 3,000 psi. compression. With a rapid qualitative method it was found that variations in the method of milling have little influence on residual stresses in a composition of phenolic resin and wood flour. The flexural strength of a phenolic bar may depend on the residual stresses present, but the connection is difficult to analyze. A complicating factor is that the true strength of the material may vary over the cross-section.

Other ASTM Symposium Papers

IN ADDITION to the papers presented at the symposia on rubber and on plastics, at the fiftieth anniversary meeting of the American Society for Testing Materials in New York in June, certain other papers were given at other symposia of interest to the rubber and plastics industry workers.

"Conditioning and Weathering of Adhesives and Plastics," by Frank Reinhart, National Bureau of Standards, was given before the "Symposium on Conditioning and Weathering." The topics discussed in the Reinhart paper included reasons for such tests, variations in procedures, interpretation of results, selection of specific tests for particular purposes, defects inherent in such tests, correlation with actual aging and weathering, and the effects of these procedures on the properties of plastics and also of adhesives.

"Determination of Mechanial Properties and Deterioration of Adhesives," by A. G. H. Dietz, H. N. Bockstruck, and G. Epstein, Massachusetts Institute of Technology, was a part of the "Symposium on Testing Adhesives for Durability and Permanence," and discussed an ultrasonic non-destructive method for testing adhesive joints which has been used to study the deterioration of phenol formaldehyde polyvinyl butyral adhesive bonds.

The cemented specimens were subjected to various heat and cold treatments. No deterioration was observed as a result of the low-temperature treatments, but certain high temperatures, dependent upon the specimen metal and diameter, do cause deterioration. The results indicated by the ultrasonic tests have been confirmed by actual tension tests.

The same ultrasonic equipment, with a few minor changes, was also used to measure the dynamic modulus of the rubbery polysulfide-type adhesives. Capacitance measurements have also been made on polysulfide bonds.

"Field and Laboratory Tests for Durability and Permanence: Adhesives Belonging to the Rubber-Resins System," by John F. Anderson and L. F. Fiedler, B. F. Goodrich Co., was also a part of the adhesives testing symposium. This paper concerned itself with a limited field of adhesives which have come into use for such purposes as bonding friction materials to metals (for example, brake bonding); metal to metals (for example, secondary structures in automotive and aeronautical industries). These materials were discussed from these angles: (1) relation to other types of joining, (2) relation to other adhesives, (3) laboratory tests for evaluation of the adhesives and of the bonds, and (4) field tests which indicate the utility and practicability of the adhesives as engineering materials.

Durability and permanence are defined in the light of this particular class of adhesives.

All of the papers of the various symposia will be published by the Society in booklet form later this year.

Expanding Kel-F Output

THE M. W. Kellogg Co., subsidiary of Pullman, Inc., leading designer and builder of petroleum and chemical processing plants, has announced that new production facilities, representing an initial expenditure of $1,000,000, are now under construction in Jersey City, N. J., for the production of greater commercial quantities of Kel-F, fluorocarbon-type plastic with claimed extraordinary resistance to heat, moisture, and chemical action.

At a press conference at the Twenty One Club in New York, N. Y., Warren L. Smith, Kellogg president, revealed that the new plant, scheduled to go into operation before the end of the year, will enable the company to meet "increasing demands for Kel-F for military and industrial purposes."

Mr. Smith said that Kel-F had its origin in connection with the development of special materials for the Oak Ridge atomic energy plant, and that it had been produced on a commercial basis by Kellogg since 1947.

"Kellogg's work over the years in laboratory and pilot plant in developing this thermoplastic has resulted in a truly continuous manufacturing process. The increased demand for the product, three previous price reductions, and the evolution of this new process have made production in expanded commercial volume now practical. Upon completition of the new plant, the current output of Kel-F will be increased to more than one million pounds annually, with manufacturing economies which are expected to provide the basis for further price reductions," Mr. Smith added.

Simultaneously with the expansion of its manufacturing facilities, Kellogg will extend its technical consulting service and its technical sales service to meet the growing requirements of Kel-F molders and end-users and to broaden further its use possibilities.

Louis C. Rubin, manager, Kellogg chemical manufacturing division, and W. E. Hanford, vice president in charge of research and development, also spoke on the development, properties, and future outlook for Kel-F. Work on Kel-F started when W. T. Miller, of Cornell University, produced laboratory quantities of polytrifluoromonochloroethylene, the plastic known commercially today as Kel-F.

Several forms of Kel-F have been developed including plasticizers (for combining with regular Kel-F to obtain varying degrees of flexibility), oils, waxes, greases, and dispersions.

Some typical proven applications of Kel-F include valve diaphragms, seats, and gaskets, drum and tank liners, flexible non-corroding containers, "O" rings, "U" packings, washers, coated wire, tube socket bases, transformer terminals, machined electrical and chemical fittings, and the like.

Dr. Hanford predicted that Kel-F will play a definite role in changing the design and construction of such basic electrical equipment as refrigerators, air conditioning units, and television and radio sets because of its ability to aid in building smaller and more compact units.

Elastomeric compounds based on fluorocarbons, which will have the elasticity of rubber over a temperature range of —80° C. to +250° F., were considered possible. In the packaging field Kel-F compounds for containers for corrosive liquids, chemical and food products, and better containers for medicinal products, especially those which require sterilization after packaging, should also be possible.

Kel-F packaging of foods which may be cooked without opening the package and which will provide the housewife with dinner simply by opening the package was predicted. A lubricating oil for automobile motors that would last the life of the car is another Kel-F development being actively worked on.

CALENDAR

Aug.	22.	Philadelphia Rubber Group. Summer Outing. Cedarbrook Country Club.
Sept.	8-10.	American Standards Assn. Third National Standardization Conference. Museum of Science & Industry, Chicago, Ill.
Sept.	8-11.	ASME Fall Meeting, Chicago, Ill.
Sept.	9-13.	Seventh National Chemical Exposition. Coliseum, Chicago, Ill.
Sept.	10-12.	National Petroleum Assn. Annual Meeting. Traymore Hotel, Atlantic City, N. J.
Sept.	11-14.	Packaging Machinery Manufacturers Institute. Annual Meeting. Homestead Hotel, Hot Springs, Va.
Sept.	13.	Connecticut Rubber Group. Summer Outing.
Sept.	14-19.	American Chemical Society. National Meeting. Atlantic City, N. J.
Sept.	17.	SAE-ASTM Technical Committee on Automotive Rubber. Rackham Memorial Bldg., Detroit, Mich.
Sept.	19.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
Sept.	25.	Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
Oct.	3.	Detroit Rubber & Plastics Group, Inc.
Oct.	6-10.	National Hardware Show. Grand Central Palace, New York, N. Y.
Oct.	7.	The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
Oct.	8.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Oct.	9.	Northern California Rubber Group.
Oct.	11-15.	National Assn. of Waste Material Dealers, Inc. National Fall Meeting. Ambassador Hotel, Los Angeles, Calif.
Oct.	15.	Washington Rubber Group. New York Section, SPE. Hotel Gotham, New York, N.Y.
Oct.	17.	Akron Rubber Group, Cleveland Section, SPE. Vinyl Symposium. Mayflower Hotel, Akron, O. Boston Rubber Group. Hotel Somerset, Boston, Mass.
Oct.	20-24.	NSC. Fortieth National Safety Congress & Exposition. Chicago, Ill.
Oct.	24.	New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
Oct.	28.	Assn. of Consulting Chemists & Chemical Engineers. Annual Symposium. Belmont Plaza Hotel, New York, N. Y.
Oct.	29-31.	Division of Rubber Chemistry. A. C. S. Hotel Statler, Buffalo, N. Y.
Nov.	6-8.	American Assn. of Textile Chemists & Colorists. Annual Meeting. Statler Hotel, Boston, Mass.
Nov.	11-19.	National Foreign Trade Council. Waldorf-Astoria Hotel, New York, N. Y.
Nov.	12-14.	American Council of Commercial Laboratories. Annual Meeting. Schenley Hotel, Pittsburgh, Pa.
Nov.	12.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Nov.	14.	Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.

SPE Prize Paper Contest

J. H. DuBOIS, Mycalex Corp. of America, is the chairman of the 1952 annual national prize paper contest of the Society of Plastics Engineers, Inc., according to an announcement by Society President W. O. Bracken, Hercules Powder Co. The contest is sponsored each year by the Society to encourage the preparation of technical papers on various phases of the plastics industry. Besides prizes offered by the SPE local sections, the national prizes in the contest are $200, $100, and $50, and the presentation of the papers by the authors at the Society's annual technical conference at the Hotel Statler, Boston, Mass., January 21-23. Judges assisting Mr. DuBois are A. J. Warner, Federal Telecommunication Laboratories, Inc.; Frank Reinhart, National Bureau of Standards; R. L. Whann, North American Aviation, Inc.; and C. R. Giannotta, Eastman Kodak Co.

The contest is open to all members of the plastics industry, regardless of membership in the SPE. Entries must be original papers in the field of plastics technology, but can cover any phase of materials, processes, applications, products, manufacturing equipment, testing, etc. Papers will be judged on the basis of their value to the industry and the skill with which the subject is analyzed and presented. All entries must be submitted to the nearest SPE local section by November 1. Complete contest rules can be obtained from the Society of Plastics Engineers, Inc., 409 Security Bank Bldg., Athens, O.

Miami Valley Outing

The annual picnic of the Miami Valley Section, SPE, was held June 20 at Terrace Park Country Club, Milford, O. Some 60 members and guests enjoyed an afternoon of golf and horseshoes, followed by a buffet dinner and the showing of a sports film. Contest winners were: golf, B. F. Bain, Cincinnati Advertising Products Co.; and horseshoes, G. J. Wilson and J. Barnhiser, both of National Cash Register Co. Handsome door prizes were won by M. H. Kasch, Kurz-Kasch, Inc.; A. J. Plimmer, Cincinnati Milling Machine Co.; and J. L. Russell, National Cash Register. Arrangements for the picnic were handled by a committee composed of M. F. Nelson, Plastic Moldings Corp. and Section president; Ralph Backscheider, Recto Molded Products, Inc.; J. P. Merke, Plastic Moldings Corp.; C. E. Weber, Crosley Division, Avco Mfg. Corp.; and Mr. Kasch.

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Scientific and Technical Activities

ASTM Fiftieth Anniversary Meeting and Committee D-11 Fortieth Anniversary Meeting

THE golden anniversary meeting of the American Society for Testing Materials in New York, N. Y., June 23-27, was an outstanding success. Featured by 20 symposia and 37 technical sessions, an apparatus exhibit, laboratory visits, and special lectures and addresses, the meeting attracted a record attendance.

The twenty-sixth Edgar Marburg Memorial Lecture was given by Robert C. McMaster of Battelle Memorial Institute on the subject of "Non-Destructive Testing."

The first H. W. Gillett Memorial Lecture was given by Normal L. Mochel, Westinghouse Corp. His subject was "Man, Metals and Power."

Committee D-11 Meeting

At the meeting of Committee D-11 on the morning of June 27, Simon Collier, Johns-Manville Corp., chairman, first called for the report of the nominating committee headed by John Allen, Firestone Tire & Rubber Co. Mr. Allen recommended that the present officers of D-11 be reelected, and this motion was seconded and approved unanimously. Mr. Collier continues as chairman, therefore, with H. G. Bimmerman, E. I. duPont de Nemours & Co., Inc., as vice chairman, and Arthur W. Carpenter, B. F. Goodrich Co., as secretary.

Mr. Carpenter then reported that the recommendations in the 1952 Annual Report of Committee D-11 were approved by D-11 letter ballot and accepted by the Society for publication.

An agreement with Committee D-9 on Electrical Insulating Materials that Committee D-11 would have jurisdiction on silicone rubber specifications and methods of test was also approved.

It was suggested by M. E. Marks, Southern-Chemical Corp., that Committee D-11 plan a session of technical papers on subjects of interest to the Committee at each of its meetings. This matter was referred to the advisory committee.

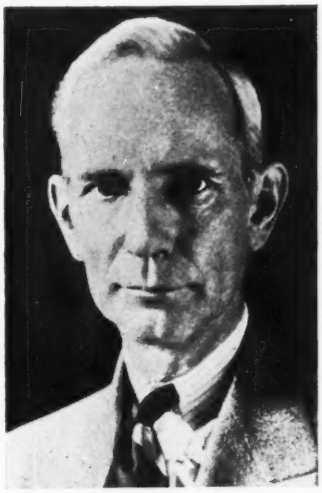
Early publication of the glossary of rubber terms, covering such work as is now complete, was urged by F. C. Thorn, Garlock Packing Co.

The meeting was concluded with the reports of the subcommittee chairmen, the details of which are given below. A report of the joint committee of the ASTM and the Society of Automotive Engineers on automotive rubber was also submitted, but the written report is not available at this writing (July 15). It will be reported separately when received.

Committee D-11 Anniversary Dinner

The members of D-11 held a special fortieth anniversary dinner on the evening of June 26, since the first meeting of D-11 was held in 1912 and the fiftieth anniversary of the Society coincided with the fortieth anniversary of D-11.

The Committee was especially honored to have as its guest at this dinner Gen. C. D. Young, formerly vice president and director of the Pennsylvania Railroad, and one of the founders of D-11. General Young was deputy director of the Office of Defense Transportation during World War II. Another one of the four original founders of the Committee, W. C. Geer, formerly chief chemist of the Goodrich company, had also planned to be present at this dinner, but was unable to do so.



Gen. C. D. Young, One of the Founders of Committee D-11

In addition to the above, the formation of D-11 was the work of the late John R. Freeman, consulting engineer, and E. A. Barrier, employed by the Associated Factory Mutual Fire Insurance Co., at that time.

Mr. Barrier was the first secretary, and E. B. Tilt, Canadian Pacific Railroad, the first chairman. The railroads had considerable to do with the early work of D-11 because of their need of standard specifications for rubber parts such as hose, axle lighting belts, air brake gaskets, etc. In addition to the railroads there were representatives from two U. S. Navy Bureaus, the Underwriters and the Electrical Testing Laboratories, Westinghouse and General Electric companies, and a number of others.

Other special guests at the dinner included Truman S. Fuller, General Electric Co., retiring president of the Society; A. T. MacPherson, National Bureau of Standards; L. Mullins, British Rubber Producers Research Association; N. S. Grace, Dunlop Tire & Rubber Goods Co., Ltd.; Bruce Silver, New Jersey Zinc Co.; A. C. Eide, American Zinc Sales Co.; and R. E. Hess and P. J. Smith, of the ASTM staff.

Chairman Collier, in his remarks, thanked J. Allen and J. Anderson, of Firestone and Goodrich companies, respectively, for their part in arranging the dinner. He also thanked Norman Bekkedahl, NBS, and his committee for the symposium on crude natural rubber that had been presented at the meeting.

The program at the D-11 dinner was informal, but included remarks by General Young and Mr. Fuller. Some of the background of the early history of D-11 was recounted by Mr. Carpenter.

ASTM 40-Year Awards

The 40-year membership of the Goodrich company was cited during the fiftieth anniversary meeting. The accompanying photograph shows Mr. Carpenter accepting the Society's 40-year Membership Certificate on behalf of the company. The award was made by Mr. Fuller.

Also cited for 40-year membership in the Society was Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J.

The Rubber Symposium

The symposium sponsored by Committee D-11 on the subject of "Recent Developments in the Evaluation of Natural Rubber," held the afternoon of June 26, attracted an attendance of between 150 and 175 persons. Symposium Chairman Bekkedahl was introduced by Committee D-11 Chairman Collier.

The latter explained that the symposium had been arranged by a committee from subcommittee 12 of D-11 on crude natural rubber headed by Dr. Bekkedahl and that it was representative of some of the work of this new subcommittee which had taken over the responsibility for devising technical specifications for natural rubber from the crude rubber committee of the Division of Rubber Chemistry, American Chemical Society, and with the approval of the latter organization.

Dr. Bekkedahl mentioned the type-descriptions for natural rubber of the Rubber Manufacturers Association, Inc., and the recent effort of the natural rubber producers to provide Technically Classified rubber. The RMA type-descriptions were termed inadequate for completely evaluating the various grades and types of natural rubber, but technical specifications, as developed, will be used as a supplement to the RMA type-classifications for some time to come.

Abstracts of the papers given at the Symposium appeared in our May, 1952, issue on pages 239 and 240. Some additional comments, however, are in order.

The first paper, "Technical Classification of Crude Natural Rubber," by R. G. Newton, International Rubber Research Board, Welwyn Garden City, England, was presented by L. Mullins. During 1951, some 16,000 tons of T. C. rubber were tested, but only 8,853 tons were actually marked and shipped, some 550 tons coming to the United States, it was said. Between 25,000 and 30,000 tons will be prepared in 1952.

In January, 1952, practical steps were taken to extend the T. C. scheme to smallholders' rubber, and several substantial deliveries of T. C.—RSS #3 have been

taken by large tire manufacturing companies. Several consumers in the United Kingdom have shown preference for "yellow" (medium vulcanizing) rubber and in the United States for "blue" (fast vulcanizing) rubber and have expressed a wish to order these types on forward contracts. Other details of the improvement of the technical specifications were explained.

The originally published program was altered to permit the presentation of the paper, "Quantitative Procedures for the Determination of Dirt in Crude Natural Rubber," as the second paper. Two practical methods for the quantitative determination of dirt at levels ranging from 0.01 to 1.0% were described, which may have possibilities for use as standard methods as more use is made of them.

A. G. Veith, B. F. Goodrich Research Center, presented two papers, the first on "Mooney Viscosity Measurements in Determining Processibility of Technically Classified Rubbers," with Rolla H. Taylor, United States Department of Agriculture, Salinas, Calif., and the second on "Technically Classified Rubber—The Non-Rubber Content and the Measurement of Cure Rate."

In connection with the second paper, discussion brought out the fact that cure rate for many types of natural rubber varies with three different non-rubber materials and that total non-rubber content would not have a direct relation to cure rate when a wide range of types was examined.

"Vulcanization Characteristics of Natural Rubbers," by R. D. Stiehler and F. L. Roth, NBS, evaluated some of the same methods for determining cure rate as the Veith paper, but with somewhat different types of rubbers. There was some difference in the conclusions between the two papers, but both suggested the use of the Mooney viscosimeter as the method most likely for use in connection with specification for T. C. rubber.

"Preparation of a Standard Rubber," by E. M. McColm, United States Rubber Co., discussed the reasoning behind the selection of creamed, spray dryed latex type of rubber for use as a standard type as well as the details of the preparation of the three lots made and analyzed by the Bureau of Standards. Preliminary indications are that a satisfactory standard rubber can be made in lots of 20 tons or more.

"Some Aspects in the Testing of Crude Rubber and Crude Rubber Compounds," by L. V. Cooper and T. M. Kersker, Firestone, first discussed procedures this company had found particularly effective in compounding and milling, storage, preparation for testing, and testing of crude rubber compounds in order to obtain consistent and high tensile strength values for samples of such rubber. The second part of their paper on the Firestone weathering machine was published in our September and October, 1951, issues.

"Rubber Evaluations with the Instron Tester" explained to many rubber technologists for the first time the rather special capabilities of this machine for obtaining almost any kind of physical test data, with this one piece of equipment. The principles of operation incorporated in the Instron tester give it wide, distinctive fields of usefulness in a rubber testing or rubber research laboratory.

The discussion which followed these together with any written discussion forwarded to the ASTM headquarters before September 1 will be included with the papers in a technical publication by the Society later this year.

Truman S. Fuller (Left) Presenting the Society's 40-Year Membership to Arthur W. Carpenter, B. F. Goodrich Co., in Behalf of That Company

Subcommittee Meetings

Subcommittee 3—Thread Rubber. J. J. Allen, Firestone, chairman. The results obtained from the circulation of a questionnaire covering the use of the "Proposed Methods of Testing Rubber Thread," published in 1950, were reviewed. It was agreed that the methods for determining yards per pound and measurement of stress-strain properties, Method A and B, were being used and were satisfactory as printed.

The method for calculating the size of the thread would be satisfactory if the specific gravity could be determined more accurately. The method for determining specific gravity will be modified to specify a 50-cc. pycnometer, a 0.2-gm. sample, and the use of alcohol as a liquid, and another round-robin test carried out.

Six manufacturers indicate that they are using the Scott Testers IP-2 machine for measuring stress-strain properties of rubber thread. Two members have the compensating carriage. A section was appointed to conduct comparative tests, and if the results are satisfactory, a tentative method of test for use of the inclined plane tester will be drafted.

The "Proposed Methods of Testing Thread Rubber" will not be recommended as tentative until the above further testing work is completed.

Subcommittee 5—Wire and Cable. John T. Blake, Simplex Wire & Cable Co., chairman. The majority vote on two letter ballots was confirmed. Proposed general revisions of the wire and cable specifications prepared according to the plan agreed upon at the last meeting in Cleveland, O.,[1] were presented and discussed at length. It was then voted to submit the revisions to the membership of the subcommittee for letter ballot.

Subcommittee 6—Packings. F. C. Thorn, chairman. The chairman was authorized to appoint a section to explore the possibility of a product specification for red sheet gasketing.

It was moved that D733-50, "Methods of Testing Compressed Asbestos Sheet Packing," be amended as follows: In paragraph 6, substitute for "the testing machine shall have a jaw separation speed of 12 inches per minute," the words "the rate of travel of the power-actuated grip shall be 12 ± 1 inch per minute." This change is made in order that D733 will conform to the wording of D412-49T, "Method of Test for Tension Testing of Vulcanized Rubber."

R. D. Farnam, F. D. Farnam Co., reported for the section on relaxation of commercial gasketing. A tentative method based on the Farnam-Cole relaxometer[2] and the Hopkins-Farnam jig (or capsule) was distributed. Work will be continued with the jig, but employing also other types of load-recording mechanisms in addition to the relaxometer. If the work has progressed sufficiently by October to warrant a special meeting of subcommittee 6, such a meeting will be called. A method is urgently needed for use both in D1170 and in the proposed specification for red sheet.

Subcommittee 7 — Rubber Latices. G. H. Barnes, Goodyear Tire & Rubber Co., chairman. The British Standards Institution latex testing specification #8192 was reviewed, and corrections were suggested in answer to a request of the BSI for comments.

The method for determination of the end point in the mechanical stability test was revised for better definition of the end point. The following changes in D1076-49T, "Specifications and Tests for Concentrated, Natural Rubber Latex, Ammonia Preserved, Creamed and Centrifuged," was recommended:

"The end point is reached when a glass rod is dipped into the latex, lightly drawn once over the palm of the hand, and small pieces of coagulated rubber are first readily seen in the thin film of liquid so deposited, and corroborated by a large increase in the amount of coagulum observed when the test has run 15 seconds longer."

Owing to the fact that the specified total solids content of the test sample in the mechanical stability test has been revised upwards from 51.5 to 55% in a compromise agreement with the International Standards Organization/Technical Committee—45 on Rubber, the 600 seconds specified in the method was tentatively reduced to 400 seconds to conform to the revised method, following a report on this matter by E. M. McColm. A note will be added to D1076-49T to cover this change until the new limit has been tried out, and the specification changed accordingly.

It was recommended by the subcommittee that D640-44, "Methods of Sampling and Testing Latices of Natural and Synthetic Rubbers," be withdrawn since it is now replaced by D1076-49T.

An additional change in D1076-49T is contemplated, dependent on a letter-ballot covering an improved sampling method, set up to insure accurate top and bottom samples of latices in tanks and tank cars where there is a tendency to stratify into definite cream and serum layers on standing.

Working sections were established or continued on the following subjects: (1) chemical stability; (2) odor; (3) film testing; (4) density.

Subcommittee 8 — Nomenclature and Definitions. Harry L. Fisher, Synthetic Rubber Division, RFC, chairman. This subcommittee did not hold a meeting in New York, but the chairman submitted a report.

"The Glossary of Rubber Terms" is being worked on actively now, and it should appear fairly complete in the not-too-distant future. A glossary was published 20 years ago in the *Vanderbilt News*; it was a worthy undertaking under the editorship of William F. Russell, and he became a member of subcommittee 8. The earlier glossary had 700 terms, and

[1] India Rubber World, Apr., 1952, p. 91.
[2] *Ibid.*, Mar., 1951, p. 679.

now we have twice that many, including those in the synthetic rubber industry.

The original subcommittee 8 comprised 15 members, which number was found too large by experience. Difficulty was experienced in getting replies and comments from so many members. Special work slowed down the ASTM activities of the chairman, and his moves from Stamford, Conn., to Baltimore, Md., and finally to Washington D. C., resulted in the work of subcommittee 8 coming almost to a standstill. Recently the chairman collected new terms, especially those in the synthetic rubber industry, and the work of subcommittee 8 is under way again.

The membership of the subcommittee has been reduced to three or four in addition to the chairman. This membership is taken from the original subcommittee, and they are all workers. Others can be called upon in connection with the definition of special terms.

The terms are all on cards. They will be defined and sent to the other members for their corrections and approval. Some of the terms will be sent to the members for definition. It is expected that the work will go forward now with reasonable speed and be satisfactorily concluded in the not-too-far-distant future.

Subcommittee 12 — Crude Natural Rubber. Norman Bekkedahl, chairman. Subcommittee 12 feels highly honored in that it was given the responsibility of staging the D-11 symposium at this, the fiftieth anniversary meeting of ASTM and the fortieth anniversary meeting of Committee D-11, Dr. Bekkedahl declared. It is the personal opinion of the chairman that the meeting was a success in that eight excellent papers were presented on "Recent Developments in the Evaluation of Crude Natural Rubber."

About 175 members and guests attended the symposium, which lasted 3½ hours in a very hot room in the Hotel Statler.

Subcommittee 15—Life Tests for Rubber Products. G. C. Maassen, R. T. Vanderbilt Co., chairman. Section 1 on Aging of Plastics, headed by J. Breckley, Titanium Pigments Corp., is to be discontinued. Mr. Breckley will serve as liaison between Committee D-20 on Plastics and subcommittee 15 of D-11 on matters pertaining to the aging of plastics.

Section 2 on Correlation between Oven and Shelf Aging, headed by R. J. Lowry, Hewitt-Robins, Inc., reported that aging period for two remaining sets of samples has not yet been determined. It was decided that the next tests would be conducted at the end of eight years. Subcommittee 28 on Statistical Quality Control will analyze the data obtained on the oven *versus* shelf aging project and suggest the most effective method of presentation.

Section 3 on Miscellaneous Properties and Their Effects on Life Aging, under the chairmanship of G. R. Reinsmith, Ordnance, U. S. Army, made a progress report.

Superior ozone resistance imparted to a 90/10 GR-S copolymer has prompted a study of the relation between the effectiveness of Tenamine 2 and the structure of the rubber. Among a large group of vulcanizates containing two parts of Tenamine 2 tested, polybutadiene derives much more ozone resistance than the others. Although two parts of Tenamine 2 gave only slight ozone resistance to other polymers besides GR-S, four parts of this inhibitor are quite effective when used in natural, nitrile, butyl, and neoprene FR compounds.

Measurements on specimens elongated 10 to 50% indicate a maximum crack growth in the vicinity of 10% elongation. A flexing test employing 110 cycles per minute and producing elongations from 0 to 25% shows that the crack-depth growth rate of dynamically flexed specimens is about half the rate of statically stressed specimens.

Ozone cabinet tests of an oven-aged 90/10 GR-S stock containing two parts of Tenamine 2 show that a large portion of the ozone resistance is lost after heating the unstressed stock for two to four days at 158° F., and one day at 212° F. Weight-loss tests on the same compound along with a control gave a 58% loss of Tenamine 2 after two days at 212° F. and a 40% loss after two days at 158° F. Two chemicals, 2,2'methylene bis tertiary butyl hydroquinone and 2,5 ditertiary butyl hydroquinone butylated hydroxyanisole, were incorporated into GR-S on a molar basis equivalent to two parts of Tenamine 2 and found to impart little, if any, ozone resistance.

Further work on ozone aging has shown that low percentages of nitrogen dioxide do not produce cracking of rubber; however, under these conditions a brittle film is formed on the surface of the sample.

Oxygen absorption studies show that for regular and LTP GR-S black stocks, definite amounts of oxygen absorbed from "air" had more effect on tensile properties than the same amount of oxygen absorbed from "pure oxygen."

A proposed tentative method for "Volumetric Oxygen Absorption Test for Aging of Rubber Polymers and Vulcanizates" is to be held in abeyance until a demand for this type of test develops.

Section 5 on Development of Test Methods for Ozone Resistance, headed by A. E. Juve, Goodrich, reported that consideration had been given to negative ballots on revisions of aging specifications D454, D572, D573, and D865, and a motion was passed that the recommendation of the subcommittee to D-11 be reaffirmed.

Section 9 on Light Source Calibration, J. E. Norton, Atlas Electric Devices, reported incomplete results from a survey of questionnaires returned indicate that very few laboratories use D749-43T, "Method of Calibrating a Light Source Used for Accelerating the Deterioration of Rubber." No recommendations will be made until more replies are received and until work in progress on another method has been completed.

Subcommittee 17—Hardness, Set and Creep. Sherman R. Doner, Raybestos-Manhattan, Inc., chairman. The section on instruments, under the chairmanship of C. G. Cashion, du Pont, presented a proposed revision to D314-39, "Method of Test for Hardness of Rubber." The revision consists primarily of specific instructions for proper care and maintenance of the instrument. The revision will be circulated together with a letter ballot in the subcommittee, and future action will depend on the results of the ballot.

ISO/TC—45 Document #149 on hardness testing was read, but no comments were received from members of the subcommittee.

C. K. Chatten, New York Naval Shipyard, submitted a brief progress report on stress-relaxation tests.

B. G. Labbe, Government Evaluation Laboratory, University of Akron, proposed that in D395-52T, "Methods of Test for the Compression Set of Vulcanized Rubber," the table be amended to clarify the deflection *versus* hardness tables, as follows:

Durometer Hardness Numbers	
Proposed	Present
25 to 34 inclusive	30 ± 5
35 to 44 inclusive	40 ± 5
45 to 54 inclusive	50 ± 5
55 to 64 inclusive	60 ± 5
etc.	etc.

The purpose of this change is to eliminate confusion as to what deflection to use when a specimen is found to be 45 or 65, etc., hardness. The subcommittee requests that this change be made editorially in D395-52T and the proposed "Tentative Method for Low Temperature Compression Set."

J. I. Belfer, N. Y. Naval Shipyard, presented an interesting paper on "Methods of Determining Compression Set of Elastomers at Low Temperatures." Special emphasis was placed on the use of a quick-acting wrench to improve manipulation. In addition, the quick-acting wrench compression set apparatus was found superior to the screw-type device with respect to duplication of compression set ratings and accuracy of the short-time (10 sec.) compression set values. Publication in the *ASTM Bulletin* was recommended.

J. Z. Lichtman, N. Y. Naval Shipyard, described the modified Admiralty indentometer constructed by the Materials Laboratory at the Naval Shipyard. Publication of these details was also recommended.

At the close of the meeting of subcommittee 17 there was an exhibit and discussion of the several available hardness testing instruments for use with rubber, as follows: Rex hardness gage, made by W. F. Orth, 800 S. Ada St., Chicago, Ill., John Zuber, representative and inventor; Shore Instrument & Mfg. Co., Van Wyck Ave. and Carll Street, Jamaica 2, N. Y., W. F. Shore Jr., representative; Wallace hardness tester (bench and hand types), Scott Testers, Inc., 101 Blackstone St., Providence, R. I., D. C. Scott, Jr., representative; standard ASTM rubber hardness testing machines, Tinius Olsen Testing Machine Co., Easton Rd., Willow Grove, Pa., Bruce L. Lewis, representative; Zwick durometer calibration instrument, Zwick & Co., Einsingen Bei Ulm-Donau, Bavaria, Germany (this instrument was displayed by Mr. Doner).

Subcommittee 18 — Flexing Tests. B. S. Garvey, Jr., Sharples Chemicals, Inc., chairman. The crack growth test, ASTM D813-44T, as revised by subcommittee 18, has been written up as ISO/TC—45, #115, as agreed at the ISO meeting in Akron, O., in October, 1950. The chairman as representative of the committee has approved the write-up.

A cooperative test of the method is in progress. All specimens were prepared and pierced at the laboratories of Imperial Chemical Industries Ltd., in England. One set was sent to Dr. Garvey, which is now being run in the Sharples laboratory. A report sent by J. M. Buist, ICI, indicates that the results depend to some extent on whether the specimens are individually molded or are cut from slabs. It is hoped that more information will become available on this point.

During the discussion of ASTM D813-44T it was brought out that flexing tests run outdoors seem to give better correlation with service than those run indoors. It was suggested that outdoor flexing tests might be classed as ozone resistance tests run under conditions of flexing. Other suggestions were that the cracking was also affected by such factors as light and moisture. Some of the work has been done on shoe uppers and might

be of interest in connection with coated fabrics and also should apply to tire sidewalls. The possibility of running de Mattia tests in an ozone cabinet was suggested. The work to date has not been done with pierced specimens and therefore is of interest in connection with D430-51T rather than D813-44T.

A section was appointed to collect information and evaluate the situation in connection with D430-51T.

Certain changes recommended in D623-41T, "Compression Fatigue of Vulcanized Rubber," have been accepted by subcommittee 18, and it is recommended that they be letter-balloted in committee D-11. The changes apply only to method A—Goodrich flexometer.

In paragraph 4, the phrase, "or a constant deflection during the test," is to be eliminated.

In paragraph 6a add, at the end, the following sentence, "No attempt should be made to test a specimen having a durometer hardness exceeding 85 Shore A."

The following paragraph is to be added to 6b: "An alternate test specimen—a truncated cone 0.77 of an inch in diameter at the bottom and 0.75 of an inch at the top by one inch in height—may be used. This specimen is easier to mold and the addition of a one-pound weight on the back of the loading beam produces a stress of 5 psi. on the specimen."

Add the following sentence at the end of paragraph 7c: "When testing at room temperature, be sure the thermocouple is at room temperature at the start of the test."

The revisions to D813-44T have been accepted by the results of the letter-ballot in Committee D-11 although there were two negative ballots. The first objection dealt with the matter of individual mounting of the specimens in the de Mattia machine. The proposed wording is such that individual clamps are permitted. The second objection was to the specified length of the stroke. Since the stroke length was not changed, this objection is really a suggestion to consider a further change.

No further revisions of D813-44T were suggested, and currently no further work is planned.

The following editorial changes were approved in D1052-49T, "Resistance of Vulcanized Rubber or Synthetic Elastomers to Cut Growth by the Use of the Ross Flexing Machine": At the end of paragraph 2b, add the sentence: "The diameter of the holes in the guide block shall be, respectively, not more than 0.010 of an inch longer than the diameter of the piercing tool, and not more than 0.010 of an inch longer than the diameter of the guide rods."

The only further work planned for subcommittee 18 is in connection with D430-51T, Method B, and continued cooperation with the ISO/TC—45 Committee.

Subcommittee 20—Adhesion Tests. L. E. Cheyney, Minnesota Mining & Mfg. Co., chairman. H. H. Irvin, Marbon Corp., presented a proposed revision of D429-47T, "Adhesion of Vulcanized Rubber to Metal," which other laboratories were requested to study. Like the existing method, it consists of two parts: (a) a button or tension pull method, and (b) a 90-degree strip method. The tension method differs from the present one in the use of a smaller bonded area (for economy of operation) and a thinner rubber piece (to reduce secondary stresses in the measurement). It is also proposed to include some operating directions in the new write-up. The strip method allows the test to be carried out with a Scott tensile tester.

Mr. Eller, of the N. Y. Naval Shipyard, described the strip adhesion testing jig used in the Materials Laboratory there. It allows a 90-degree strip test to be carried out with an ordinary Scott tester. It is also applicable to end-product testing.

Mr. Mathues, of Inland Mfg. Division, General Motors Corp., reported on additional work which he has done with the Buist-Naunton impact adhesion test. His results have thus far failed to show any advantages for this method. The method does possess some disadvantages, and the equipment used is expensive. It was suggested that Mr. Mathues explore the subject further with Mr. Buist.

Subcommittee 21—Rubber Cements and Related Products. J. F. Anderson, Goodrich. chairman. Agreement was reached with respect to the selection of illustrations for the proposed "Tentative Methods of Tests for Adhesives and Brake Lining and Other Friction Materials." A program was developed for round-robin testing by six participating laboratories of the new methods to check the reproducibility of the results using identical materials. General Motors Research, Armstrong Cork Co., Chevrolet Gear & Axle Division (GMC), Raybestos-Manhattan, and Goodrich have indicated a willingness to assist in this work.

From the results of the above-mentioned testing program, a set of minimum values for specification purposes, is expected. Preliminary work indicates the reliability of the test methods. The materials to be used in the testing programs, for the present at least, are: (a) passenger-car brake shoes, 11 by 2 inches; (b) Marshall 2201 lining material; (c) bonding tape currently in use at Chevrolet Gear.

Mr. Westerman, Ford Motor Co., suggested an additional test method to meet requirements for shear test of shoe and lining assemblies to be made at a predetermined rate of temperature rise under constant load, conditions of compression shear.

This suggestion and others will be submitted in the near future to the subcommittee for official action by the chairman, pending which the test methods are to be published as presently approved.

Subcommittee 23—Hard Rubber. C. P. Morgan, Vulcanized Rubber & Plastics Co., chairman. The asphalt section held a general discussion of the proposed method for "Impact Testing of Asphalt Containers," and a review of various comments received prior to the meeting was made. After revisions to the present draft, it was recommended for letter-ballot in Committee D-11.

The section on hard rubber discussed the matter of a classification of hard rubber compounds similar to that used for soft rubber automotive compounds in D735. This matter will be discussed further at the next meeting.

Subcommittee 24—Coated Fabrics. S. H. Tinsley, R. Vanderbilt, chairman. The section on abrasion, headed by K. L. Keene, U. S. Rubber, gave a report on the results obtained with the Stoll Quartermaster universal wear tester made by Custom Scientific Instrument Co. The report on only one grade of coated fabric, vinyl coated net, indicates the results obtained are quite reproducible when run to the same end point and calculated to give the number of cycles necessary to remove 0.001-inch of coating. It was decided to investigate this machine further, using various types of coated fabrics and abrading materials, and possibly to run a round-robin series of tests. It was also suggested that the Schiefer abrasion testing machine be included in the tests.

E. B. Roberts, Hood Rubber Co., section chairman on adhesion testing, gave a report on the revision of D751-46T, "Testing Rubber Coated Fabrics." Of the three points under consideration, only one has had sufficient study to permit a recommendation. In connection with the distance of pull-down, insertion into section 39 on procedure of the sentence, "The distance of separation of the coating or plies shall be three inches," is recommended. Recommendations on the other two points are anticipated by the time of the next meeting of subcommittee 24, together with additional test methods for thin films, particularly of the vinyl type.

J. H. Bowen, Jr., Bureau of Aeronautics, U. S. Navy, gave a demonstration and discussion of a new flex testing machine that has been developed by the Bureau, particularly for testing the quality of vapor barrier materials. This machine, called the Naes or Galbo flex tester, was presented for possible use in the evaluation of coated fabrics to severe flexing.

Subcommittee 25—Low Temperature Tests. R. S. Havenhill, St. Joseph Lead Co., chairman. Irving Kahn, U. S. Army Ordnance, reporting for Gerald Reinsmith, chairman of the section on the T-R test, recommended that the Temperature-Retraction test, with certain recommendation as to elongation and restrictions as to specification use, be written up as a tentative ASTM method. With the approval of the subcommittee, the chairman appointed a committee to draft the tentative T-R method consisting of O. H. Smith, U. S. Rubber, chairman; R. F. Shaw, Rock Island Arsenal; C. K. Chatten; J. F. Svetlik, Phillips Petroleum Co.; C. B. Griffiths; and B. G. Labbe.

Mr. Labbe, chairman of the section on torsion wire standardization for the Gehman stiffness tester, circulated a report on revised procedure for standardization of the torsion wire, torsion wire constant limits of ± 3% of specified value, and a formula and table for calculating modulus of elasticity in psi. The report was approved, and the standardization method, torsion wire constants, and the method of calculating the modulus of elasticity will be incorporated in D1053-49T, "Measuring Low Temperature Stiffening of Rubber and Rubber-Like Materials by the Gehman Torsional Apparatus."

Mr. Chatten, chairman of the section on ISO/TC-45 activities presented a report on all the different stiffness methods now in use for low temperature testing and recommended that the Gehman torsional stiffness tester be proposed as an ISO standard. Other tests and recommendations for the determination of hardness, crystallization, etc., will be covered by Mr. Chatten at the next meeting of the subcommittee. A. J. Kearfott, General Motors, mentioned the advantages of expressing stiffness in terms of the angle of bend.

Mr. Kahn read a report regarding the Armed Services requirements for low-temperature test methods.[3] The Armed Services preference for solenoid machines in D746-44T on brittle point testing is being reconsidered because of some con-

[3] *Ibid.*, July, 1952, p. 500.

cern regarding agreement between solenoid and motor driven equipment. A. G. Hanson, U. S. Army Ordnance, will head a committee consisting of F. L. Graves, American Cyanamid Co.; D. C. Scott, Jr.; W. N. Keen, du Pont; and Bruce Lewis to investigate this situation.

Subcommittee 27—Resilience. E. G. Kimmich, Goodyear, chairman. The section on forced vibration testing presented its survey of eight existing methods for determining resilience, damping, and dynamic modulus under conditions of forced vibration. Committee D-20 on Plastics has made a similar survey of nine methods, one of which is included in the eight investigated by subcommittee 27. The two groups have interchanged this information with the result that both groups now have detailed knowledge of 16 methods. It is not yet clear how to bring standardization into this situation, but certainly these surveys have provided a necessary preliminary step.

In connection with D945-49T, "Yerzley Oscillograph Testing for Mechanical Properties of Rubber under Compressive Shear Strains," additional data which showed a marked effect of creep on resilience, as determined by this method, was presented. Also a new proposal to change the dimensions of the shear sample was received and discussed. The subcommittee was fortunate in having Felix Yerzley present to give a comprehensive review of the background of his oscillograph, its capacities and limitations, as well as some thoughts on means of improving this instrument.

A section to investigate D1054-49T, rebound pendulum test, authorized in March, has only recently been appointed. A round-robin test to determine the optimum initial angles for hard compounds should be completed by the next meeting of the subcommittee.

Subcommittee 28—Statistical Quality Control. J. D. Heide, U. S. Rubber, chairman. A motion picture on statistical quality control produced by Johns-Manville was shown.

The section investigating the relative merits of the use of the median *versus* the arithmetric mean in reporting physical tests on rubber vulcanizates recommended the use of the median. The recommendation was forwarded to subcommittee 10, which had requested the investigation.

The request by subcommittee 15 for a method of analysis of aging data accumulated on shelf *versus* artificial aging was thoroughly discussed. A method of analysis of the data has been developed, but requires a large amount of computation and the results will be very limited in their use. The method will be recommended and outlined in a report to subcommittee 15.

A preliminary report on the matter of sampling crude natural rubber, as requested by subcommittee 12, will be submitted.

There was considerable discussion of the design of round-robin testing experiments to insure that the results obtained are statistically sound. In view of the fact that many such tests are run which give results that may have no statistical basis, it is recommended that all D-11 subcommittees planning interlaboratory tests submit the plans to subcommittee 28 for investigation of the experimental design.

At the next meeting of subcommittee 28, Mr. Mandel, NBS, will present a paper on the "Basic Principles of Interlaboratory Testing." Members of all subcommittees are invited to attend.

SAE-ASTM Committee on Automotive Rubber

MEETING No. 60 of the SAE-ASTM Technical Committee on Automotive Rubber was held June 24 at the Hotel Statler, New York, N. Y., with 42 persons attending. H. A. Winkelmann, Dryden Rubber Division, Sheller Mfg. Corp. and chairman of the committee, presided over the meeting and was assisted by Secretary J. T. O'Reilly, Ford Motor Co.

General Meeting Notes

Reports from the different sections of the committee were presented, as given below. It was announced that a recent letter-ballot had given approval to SAE R-41 on ⅛-inch hydraulic brake assemblies; an SAE standard (unpublished) on ¼-inch hydraulic brake assemblies; and ASTM D571-51T on methods of test for automotive hydraulic brake hose. The advisory committee, under Dr. Winkelmann, reported that meetings of the committee and its Section IV will be scheduled on the same dates to save time and minimize duplication.

A suggestion has been made that the committee consider the advisability of setting up "trim" standards for the automotive industry. E. H. Smith, Bendix Products Division, Bendix Aviation Corp., was appointed to review the problem and report back to the committee. Simon Collier, Johns-Manville Corp. and chairman of ASTM Committee D-11 on Rubber and Rubber and Rubber-Like Materials, welcomed the committee to the meeting which was held in conjunction with D-11's meeting.

The next meeting of the technical committee will be held September 17 at the Rackham Memorial Bldg., Detroit, Mich.

Section Reports

Section I—Vibration Insulators. E. G. Kimmich, Goodyear Tire & Rubber Co., chairman. A report on available motor-mount testing machines has been distributed to the section members, and a meeting will be held later in the summer to discuss this report and plant future activities.

Section IV—Classification and Specification of Automotive Rubber Compounds. J. J. Allen, Firestone Industrial Products Co., chairman. Further revisions are being made in the table on Type T, Class TA temperature resistant (silicone) compounds to appear in ASTM D735-52T. A letter-ballot will be conducted on revising the table on Type T, Class TB heat resistant (polyacrylic) compounds. The question of including electric wire and cable covering in D735 will be referred to the SAE electrical committees.

Section V—Automotive V-Belts. Mr. Kimmich, chairman. Revisions of the SAE standard on V-belts and pulleys are being submitted to the full committee for letter-ballot. The section has defined its scope as covering "recommendations to the technical committee concerning specifications, dimensional standards, quality standards, methods of test, and definitions of terms for V-belts intended for use as integral parts of automotive vehicles." This definition of scope was approved by the committee.

Section IX—Hydraulic Brake Cups. S. R. Doner, Manhattan Rubber Division, Raybestos-Manhattan, Inc., chairman. A specification on brake boots is being drafted and will be distributed for comments. The section has informed the Armed Services that GR-S cups are satisfactory for use, and all brake cups used by Army Ordnance after August 1 will be of GR-S.

Section X—Gaskets. A new chairman is to be appointed, following the resignation of W. B. Davies. A round-robin test on gaskets is in progress.

Section XI—Oil Seals. Mr. O'Reilly, chairman. The 1947 procedure on testing oil seals is under revision, and the new procedure will be submitted to the committee. A specification on O-rings, showing classes of compound, methods of test, and dimensional tables, is expected to be available in September.

Section XII—Preparation of a Manual on Laboratory Procedure. J. C. Dudley, Chrysler Corp., chairman. The section has decided to obtain comments from testing groups, engineers, and procurement personnel as to the scope of the section. Comments are also invited from other committee members.

More Group Outings

First for Washington

THE first annual field day of the Washington Rubber Group, was held on June 27 at the Annapolis Roads Club, Annapolis, Md. Approximately 100 members and guests took part in the program which included a picnic lunch, golf and other sports contests, and an evening dinner followed by the distribution of some 80 door and contest prizes.

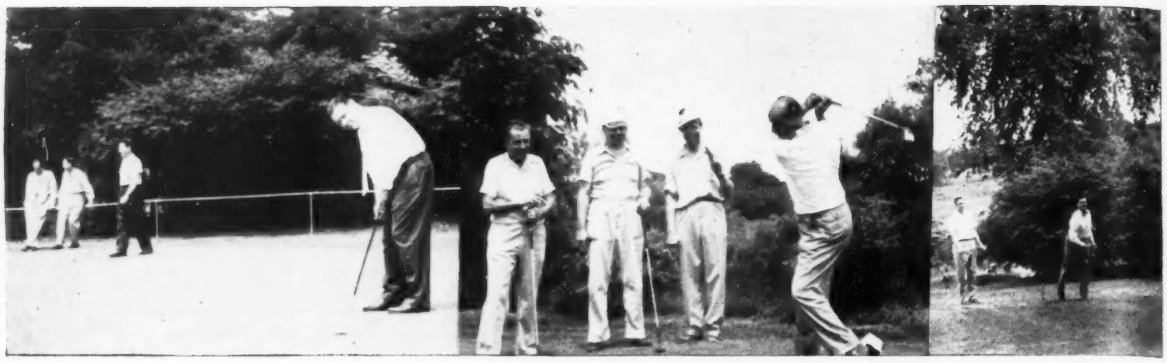
The WRG trophy in the golf tournament was won by Russell Kurtz, E. I. du Pont de Nemours & Co., Inc., with Larry Koppel, Firestone Tire & Rubber Co., runner-up. The industrial trophy was won by H. D. Brown, Gates Rubber Co.; while second prize went to R. J. Devereaux, B. F. Goodrich Co. The women's trophy in the golf tournament was won by Marge Rice, a guest. Prizes in the other events went to the following: bridge, C. C. Miller, Rubber Manufacturers Association Inc.; water sports, Walter Krappe, NPA; laziest golfer, T. R. Scanlon, Gates Rubber; horseshoes, L. S. McCoy, Quaker Rubber Co.; women's ping pong, Ethel Levine, Navy Bureau of Ships; men's ping pong, V. Sabary, Office of Navy Materials; swimming, Oneta Smith, guest; and fishing, Roy Blandford, guest.

Outing committee members were as follows: golf, Devereaux and Scanlon; sports, I. T. Miller, Gates Rubber, Don Kothe, Potomac Rubber Co., and Miss Levine; and prizes, W. J. Sears, RMA, and R. E. Harman, Connecticut Hard Rubber Co.

Akron Outing Sets Record

A record attendance of 709 members and guests participated in the annual summer outing of the Akron Rubber Group, held June 20 at the Firestone Country Club. The outing featured a golf tournament in which 245 persons took part. Other activities included an afternoon of softball and horseshoe pitching, followed by a dinner and the distribution of more than 400 door prizes.

In the golf tournament, John Cseh, Firestone Tire & Rubber Co., retained his championship with a par-breaking 69 score. Runners-up were C. E. Greene, General Tire & Rubber Co., and Paul Tobin, Fire-



Photographed at the Akron Rubber Group Outing: (*Left to Right*) Chairman L. M. Baker, General Tire, Putting; Ream Cook, Joseph Bodnar, Norman Klemp, and Harold George, All of Standard Products Co.; and Horsehoe Pitching Contest

stone. Milton Leonard, Binney & Smith Co., won the "hand mashie" event; George Lenhart, Wilson Rubber Co., took the prize for longest drive; and Warren Grote, General Tire, placed first in the accuracy contest.

William V. Sauter, E. I. du Pont de Nemours & Co., Inc., was general chairman of the outing committee. He was assisted by L. V. Cooper, Firestone; Harry McCollum, du Pont, in charge of the golf subcommittee; and Charles Stalker, General Tire, in charge of the prizes subcommittee. Membership Committee Chairman George Hackim, General Tire, announced that the Group now has a record total of 1,446 paid members.

The fall meeting of the Akron Group will be held October 17 at the Mayflower Hotel, Akron, O. The afternoon session will be a symposium on "Vinyl Compounding and Processing," arranged in conjunction with the Cleveland Section, Society of Plastics Engineers, Inc. The symposium will be followed by a social hour and dinner, with the evening program highlight a talk by William O'Neil, president and board chairman of The General Tire & Rubber Co.

Good Day for Boston Group

The sixteenth annual summer outing of the Boston Rubber Group was held at the Andover Country Club, Andover, Mass., on June 20 under a cloudless sky. More than 500 members and guests enjoyed an afternoon of golf, softball, and other games, followed by a dinner and the distribution of prizes. Through the generosity of 193 contributing firms, every person attending received a door prize. Credit for the success of the outing is due the committee under the chairmanship of E. D. Covell, Stedfast Rubber Co., and including J. E. Williamson, Tyer Rubbber Co., and Harry Atwater, Hood Rubber Co.

The golf tournament attracted the most participants and was under the direction of L. L. Longworh Monsanto Chemical Co. In charge of the other contests were the following men: softball, E. F. Freeman, Stedfast; putting, W. A. Griffin, Stedfast; darts, N. W. Herthel, Hood; horseshoes, R. P. Painter, Marbon Corp.; horse racing, Carl Meyer, Barrett Division, Allied Chemical & Dye Corp.; badminton, Wm. Walker, Hood; and tub and ball game, D. W. Kirkpatrick, Boston Woven Hose & Rubber Co.

First-prize winners in the various golf events were: kicker's handicap, H. A. Garfield, A. L. Varney Co.; low gross, H. D. Bainbridge, Boston Varnish Co.; low net, A. D. Macdonald, B. B. Chemical Co.; nearest to pin, Tom Kane, B. F. Perkins Co.; long drive accuracy, (under age 45) W. L. and W. B. Henderson, both of Avon Sole Co., (age 46-66) W. R. Smith, Godfrey L. Cabot, Inc., and (over age 66) W. E. Kavenagh, Goodyear Tire & Rubber Co.; high gross; T. W. Kendall, Hood; and high net, Jack Andrews, Collyer Insulated Wire Co.

Other contest first-prize winners were: softball, team of Godfrey L. Cabot; putting, Mr. Bainbridge; horseshoes, (team) W. Mason and W. Bolter, both of Haartz-Mason, Inc., and (singles) W. Bolter; tub and ball game, tied among M. H. Bretscher, Hood, Herbert Johnson, D. H. Litter Co., Richard Gnecco, Boston Woven Hose, and R. W. Briner, Firestone Tire & Rubber Co.; and darts Edward Bradley, Acushnet Process Co.

Many Prizes Won at Buffalo

The annual summer outing of the Buffalo Rubber Group was held on July 22 at the Transit Valley Country Club, East Amherst, N. Y., attracting approximately 70 members and guests. Activities included golf, softball, horseshoes, egg throwing contest, and baseball accuracy throw. A chicken dinner followed the athletic events.

Charles Johnson, of Hewitt-Robins, Inc., was general chairman for the affair.

Winners in the different golfing events included: low gross, Merrill Hickey; high gross, Fred Kohlhagen, Hewitt; and Paul Sick, Hewitt; C. M. Lavin; P. P. Gaffenhagen; F. H. Smart; W. T. Rossiter; Merrill Hickey; W. V. Sauter; Sid Freeman; H. C. Meyer; R. H. Sharp, U. S. Rubber Reclaiming Co.; A. T Schorr; L. Mohr; Ed. Martin; W. V. Butler; R. C. Emmett; F. Blanchard, Hewitt; R. Babbit, and R. C. Boltz.

Many door prizes were distributed as another feature of the outing, donated by Xylos Rubber Co., Dunlop Tire & Rubber Corp., C. P. Hall Co., and Hewitt.

Identification of GR-S Oil-Extended Polymers

IN PREVIOUS memoranda[1] the synthetic Rubber Division, RFC, stated that Circosol 2XH, Sundex 53, Shell SPX 97, Dutrex 20, and similar tyes of oil would be used interchangeably in the production of GR-S oil-rubber masterbatches. Since such interchangeability has been questioned by the industry, a new memorandum, dated June 27, states that the following indicated oils will be incorporated in the masterbatches:

Oil Masterbatches: GR-S 1700, X-682, X-693, and X-709—Circosol 2XH or equivalent; and GR-S 1701, GR-S 1702, X-692, and X-706—Shell SPX 97 or Sundex 53 or equivalent.

Pigmented Oil Masterbatches: GR-S 1800—Circosol 2XH or equivalent; and X-668 and X-691—Sundex 53 or Shell SPX 97 or equivalent.

The equivalent for Circosol 2XH is an oil meeting the Division's specifications for naphthenic processing oils. The equivalent for Sundex 53 or Shell SPX 97 is an oil meeting the Division's specifications for aromatic processing oils. In addition to the usual chemical and physical properties, these oil specifications will require consumer approval based on factory processing evaluations.

[1] See our June, 1952, issue, p. 386.

Correction

IN THE article, "Armed Forces Rubber Testing Symposium," by Irving Kahn, which appeared in our July, 1952, issue on page 500 the sentence at the top of the second column on that page which said: "There are some indications that the solenoid type of tester is preferred," should have been eliminated. The author's request was not received in time, however, for the elimination in our July issue. Mr. Kahn now states that certain undesirable features have been found in the solenoid instrument, and, as a result, a comprehensive comparison of the motor driven and solenoid actuated instruments is currently being made by Rock Island Arsenal and subcommittee 25 of ASTM Committee D-11.

Also, on the same page at the bottom of the second column, "Wright Field Air Development Center" should have read "Wright Air Development Center."

K. W. George has been appointed controller for Continental Carbon Co., 295 Madison Ave., New York 17, N. Y., and its affiliated carbon black companies. Mr. George came to Continental as a cost accountant from Mullins Mfg. Corp. in 1950.

NEWS of the MONTH

Big Styrene and Vinyl Resin Expansions Approved; Lower GR-S Production Scheduled

Although no meetings of the top synthetic rubber-plant disposal planning officials and rubber, petroleum, and chemical companies involved in the current operation of the plants have been held since early June, major factors are being considered in this matter in Washington. The administration of the Reconstruction Finance Corp. is trying to formulate an acceptable disposal program, but if it finds the task impossible, it will so inform Congress next March, it was indicated.

With consumer orders slightly lower than in 1951, RFC started to close down some of its high-cost facilities, i.e., alcohol butadiene units, and copolymer units using alcohol butadiene.

Big expansions in styrene and vinyl resin production capacities were announced in Washington during June and early July. Certificates of rapid tax amortization were granted to various companies, and the total cost of the planned expansions announced for styrene was almost $47 million. For vinyl resins, expansions costing about $8.5 million were approved. Also announced were expansion plans for the production of butadiene osting about $5.5 million. The major part of the expansion of styrene capacity is expected to be used in plastics.

With the termination of exclusive natural rubber buying and distribution by the General Services Administration on July 1, that agency is trying to set up a procedure for stockpile rotation agreeable to both consumers and rubber dealers. No decision on procedure is expected to be reached, however, before the end of August.

The Office of International Trade announced in July that it will permit the exportation of 2,500 long tons of butyl rubber in the third quarter of 1952.

Talks between the Big Four rubber companies and the United Rubber Workers of America, CIO, on wage and/or working conditions, which have been in progress in some instances since early June, have made little progress, but some decisions are expected by August 1.

Washington Report

By

ARTHUR J. KRAFT

Synthetic Plant Disposal

There have been no meetings since June 9-10 between the top synthetic rubber-plant disposal planning official of RFC, Morton E. Yohalem, and the rubber, petroleum, and chemical companies involved in the current operation of the synthetic rubber plants. Likelihood is that, pending the completion of preliminary staff work, Mr. Yohalem will next meet with the industry representatives shortly after Labor Day. A preliminary report on plant disposal is to be submitted to Congress by RFC on March 1, 1953, and it is considered probable that RFC will avail itself of all the time it has before submitting the report.

In connection with a disposal plant, the government agency is expected to attempt no more than establishing ground rules for the consideration of Congress, quite a task in itself. It is not expected that an attempt will be made to get prospective purchasers to state their buying and leasing intentions, plant-by-plant. At the moment RFC has not decided whether to cover all facilities in its consideration of disposal, or to drop from consideration some of the higher-cost plants, such as those producing alcohol butadiene. The butyl plants, generally considered to present a relatively simple disposal problem, may be treated separately in any program placed before Congress, but this point has not yet been decided.

The early June meetings of the industry representatives with RFC, the first and only meetings on disposal to date, indicated a greater degree of unanimity in industry opinion on the desirability of early disposal than had been considered likely. At least, the divergencies as between various companies on their approach to the issue were less sharp than generally thought, although a good deal of divergency in a minor degree exists.

The Steelman report of 1950, "Synthetic Rubber—Recommendations of the President—Transmitted to the Congress, January 1950," is expected to play a prominent role as a guide to RFC in setting the recommended ground rules for disposal. Among the problems in framing a disposal program are reconciling the anti-trust and security guarantee conditions set forth in the above-mentioned report with the establishment of a privately owned and operated synthetic rubber industry.

The Steelman report of 1950, representing the considered views of some 13 government agencies on the disposal issue, is expected to serve as a guide to RFC in setting the ground rules—or general terms—for disposal, although changed conditions since 1950 may lead RFC to modify some conditions set forth in that report.

Confronting the disposal planners is the problem of reconciling the anti-trust provisions incorporated in that report at the insistence of the Justice Department with the rubber industry's preference for integrated operation. National security guarantees, mandatory consumption and production floors, if they are continued, must be tailored to fit a competitive, privately owned and operated synthetic rubber industry.

Whether a policy of price fixing, as suggested by some in the interests of protecting the economies of the natural rubber producing countries, or a policy of allowing synthetic rubber prices to find their own level should be followed, is another matter facing disposal planners.

Another weighty problem is assuring an adequate supply of feedstocks to operators of copolymer plants. The Steelman report is specific in opposing common ownership of butadiene and copolymer facilities, although it suggests that exceptions might be permitted. The rubber companies are reported much concerned with this problem and may balk at any program in which they see their assurance of the necessary raw materials put in jeopardy.

As for the price of synthetic rubber, RFC is subject to conflicting influences, not all of them relating to disposal. The consumer interest would dictate keeping prices low, and these are the same consumer or public interests that constitute the basis for the anti-trust provisions of the Steelman report. On the other hand, RFC regards it as certain that the costs of producing and selling GR-S would be higher under private operation than government operation. Therefore the private industry's interest in buying plants, particularly the less efficient ones, might well hinge on whether the government will encourage a high enough price for GR-S to assure profitable private operation of the plants. Aside from this point, RFC is currently considering the effect of a change in its selling price on the economics of Asian natural rubber producing countries.

It seems fairly evident that a disposal program should, and perhaps must, provide for simultaneous disposal of the vast majority of the plants which will be kept in operation, and Congress will probably insist on a production floor—mandatory production. Any attempt to peel off only a few plants, while retaining a large government production, probably would not work, since industry, as exemplified in butyl, has shown a marked reluctance to compete with the government when it sells at cost. If RFC were to change its policy, the question remains of giving one or two companies a big headstart in the field. Disposal may have to be pretty close to an all or nothing proposition to assure a competitive industry, which Congress has said is necessary to protect national security, once the government relinquishes complete control.

All these questions have a bearing on whether RFC can elicit high enough bids for its properties to satisfy the Congress. On the basis of earlier expressions of Congressional views, it can be assumed that Congress will be watchful lest the government fail to get a sufficient return for its investment. On top of this attitude there is what might be called the psychological impact on Congress of the financial terms which industry will agree to. The Congressional Armed Services committees has given evidence in the past of doubts as to the earnestness of industry's appeals for a chance to buy the plants. To get Congress to acquiesce to any disposal program may require a strong display of interest in producing synthetic rubber, and one evidence of this would be a willingness to put a heavy chunk of cash on the line.

The RFC administration is intent on doing the utmost to come up with an acceptable disposal program, which means surmounting the various problems outlined above. If it finds that task impossible, it will so inform Congress, and no disposal program will be presented.

RFC Rubber Activities

RFC Administrator Harry A. McDonald announced June 26 that the agency "does not plan at this time to make any

change" in its selling price for GR-S. He said the "question of whether there should be a change in price" is still being considered.

The statement, made in a press release, was prompted by the holding off of orders for July delivery of GR-S by some of the larger consumers, who were anticipating a price reduction July 1. Mr. McDonald's statement, in effect, was aimed at scotching rumors that a price cut was imminent and resuming the normal flow of consumer orders for materials from RFC plants.

With consumer orders apparently settled at a slightly lower level than in 1951, and RFC's GR-S inventories at the 75,000-ton level specified by the DPA, the agency last month started to close down its higher-cost facilities, which gave rise to the price cut rumors.

On July 1 the Louisville, Ky., alcohol butadiene plant was shut down completely; while one of the two producing units at the Kobuta, Pa., alcohol butadiene plant likewise was closed down on that date. This closing left one alcohol butadiene unit remaining in operation, and, as previously announced by Mr. McDonald, this unit is to be closed about September 1.

RFC announced on July 1 that it had reversed its earlier decision to shut down the Institute, W. Va., copolymer plant on that date. The early June order on this plant was reexamined at the request of Sen. Harley Kilgore (Dem., W. Va.), who was concerned with the layoff of employes incident to closing the plant.

Instead of closing the plant, RFC ordered it to remain in partial operation, producing 2,500 tons of GR-S (all of it 122° F. GR-S from alcohol) in July, as compared with the 5,800 tons it produced in June. This plant had been operating at about 6,000 tons for several months, or two-thirds of capacity. B. F. Goodrich Chemical Co., operator of the plant, was instructed by RFC to place a unit, idle for several months, in adequate standby condition so that it might be reactivated on 90 days' notice. Mr. McDonald said that on the basis of the July production schedule at Institute, continued employment was provided for about 400 full-time employes. About 530 were on the payroll at Institute in June.

The Lake Charles, La., copolymer plant operated by Firestone Tire & Rubber Co. was completely shut down by an explosion on June 28. The mishap was reported to have cost RFC about 4,000 tons of GR-S in July. The plant got back at half its normal production rate on July 10 and was expected to produce about 3,000 of the 7,000 tons originally set for July.

RFC scheduled July production of GR-S at 47,200 long tons, but final figures may show actual output falling shy of its total because of the explosion damage at the Lake Charles plant. The July schedule called for 22,801 tons of cold rubber, 12,167 tons of black masterbatch, 3,777 tons of oil masterbatch, 477 tons of oil-black masterbatch, and 3,341 tons of GR-S latex. Actual sales in June totaled 48,351.3 tons of GR-S, including 20,898 tons of cold rubber. Black masterbatch sales amounted to 8,456.6 tons, oil masterbatch to 3,230.2 tons, oil-black masterbatch to 773.4 tons, GR-S latex to 3,442.4 tons, and butyl to 5,077.7 tons.

Ends Exclusive Rubber Buying

GSA relinquished its role as exclusive American importer of natural rubber at midnight June 30 with a public declaration by its Administrator, Jess Larson, that the 18-month program was a "complete success."

Mr. Larson said, "The rubber industry in this country deserves full credit for the cooperation it gave the government throughout its operation."

He promised a final accounting of GSA's activity as rubber buyer and reseller "as soon as all the facts are in"—facts, in this case, meaning the ships now afloat with rubber ordered by GSA in previous months. Mr. Larson declared GSA intends to pursue a policy of "normal purchases for rotation" of the huge natural rubber stockpile.

"I am happy to report," he stated, "that the position of the rubber stockpile is good, and the world price is much more reasonable" than when GSA first took over exclusive buying. "Through normal purchases for rotation we hope this situation will continue," he added.

GSA's objective, when it undertook its role of exclusive buyer 18 months ago, "was to raise rubber stocks to high levels and to bring about a price situation more in keeping with reality than the nearly 80¢ a pound price that existed in December, 1950." Larson also noted that "the program of bringing rubber into this country for the immediate use of industry has been self-supporting, and any service which GSA performed for private companies has been paid for by those companies. Lower prices have benefitted everyone concerned."

Meanwhile the Office of Price Stabilization has all but formally dropped any intention of establishing price ceilings over the free natural rubber market. It is generally assumed that should the price of natural rubber climb sharply upward again, the government would quickly step back in as exclusive buyer or take other effective steps to bring down the price.

GSA Rotation Procedure

GSA in mid-July sent letters to 22 large rubber goods manufacturers and the Rubber Trade Association of New York asking for comments on how the natural rubber stockpile rotation program should be set up. The agency made one specific suggestion, originally offered by one manufacturer, that manufacturers deal directly with GSA in buying rubber offered from rotation stocks and in replacing that rubber. GSA, in suggesting this, had in mind those manufacturers (the major consumers) with overseas rubber purchasing agents. With the letter was enclosed GSA's rubber rotation schedule, the initial schedule listing all lots of rubber being made available for purchase now that rotation is being resumed after 18 months of exclusive government buying and selling.

During the latter part of July several manufacturers responded to the GSA letter stating that they lack the facilities to deal directly with GSA on rotated rubber and will have to utilize the services of the dealer trade. None of the manufacturers with overseas buying agents has responded. The RTA likewise has not presented a firm opinion, although its officials met with GSA immediately after the letter was received to discuss the rotation program.

The heart of the issue apparently is an economic matter, whether the dealers should be bypassed in any portion of the rotation program, thus missing out on a possible handling commission. Prior to the exclusive buying period, all rotated rubber was handled through dealers. On the other hand, some of the manufacturers with the means to do so may find economies in dealing directly with the government. It might also be noted that the dealer trade was cut in on rubber transactions throughout the exclusive buying period, receiving commissions for the rubber handled for GSA. Most of the rubber being put up for rotation—about 20,000 tons—was purchased by GSA during this period, and dealers have already earned a commission for handling it.

Towards the end of July, the rotation procedure was far from being firmed up, and it may be late August before any rubber is sold by GSA.

Styrene Expansion

The Defense Production Administration announced on June 24 a nationwide goal to boost production of styrene monomer (including methyl sytrenes) to an annual rate of 1,210,000,000 pounds by January 1, 1955.

The goal represents an expansion of 584 million pounds over the 626 million pounds capacity in place on January 1, 1951. The 1951 capacity of 626 million pounds went about half into plastics and half into synthetic rubber production, with the demand for plastics running considerably higher than the amount allocated for this use. Expansions since then have brought styrene output to the current rate of about 720 million pounds a year.

Of the 584-million-pound expansion program, 24 million pounds will be provided through expansion of the government owned plant in California, DPA said. This plant, operated by Dow Chemical Co., currently supplies about half the styrene used by the synthetic rubber program. Tax amortization certificates have been issued already for facilities with a total capacity of 326.2 million pounds; while certificates have been recommended for an additional 231.8 million pounds in new facilities. This leaves only two million pounds of the 584-million-pound expansion yet to be provided for, DPA noted.

In June, DPA listed the following styrene projects, giving name of company, location of facility, amount certified, and percentage of that amount allowed for rapid, five-year tax write-off:

Foster Grant Co., Port Arthur, Tex., $4,284,450 at 60%; Union Carbide & Carbon Corp., Kanawha County, W. Va., $1,081,000 at 60%; Pathfinder Chemical Corp., Point Pleasant, W. Va., $11,496,320 at 60%; Dow Chemical Co., Midland, Mich., $3,250,000 at 60%, and Freeport, Tex., $9,400,000 at 60%; Marbon Corp., Gary, Ind., $70,045 at 45%; and Pennsylvania Industrial Chemical Corp., Jefferson, Pa., $3,807,650 at 50%.

The major part of the expansion during the next few years is expected to be used in plastics, although any increase in demand for synthetic rubber, as visualized recently by the rubber industry and the Paley Commission report, would require additional styrene.

Between June 27 and July 3, DPA authorized additional rapid tax write-off certificates for styrene expansion projects to the following companies, at the locations given, for the amounts indicated, and with 45% allowed for five-year amortization:

Dow, Allyn's Point, Conn., $3,314,500 and Torrance, Calif., $1,723,000; Monsanto Chemical Co., Springfield, Mass.,

How TIMKEN® bearings on calender rolls keep gage uniform, eliminate roll neck wear

THE gage of plastic film and rubber sheeting *stays* uniform when calender rolls are mounted on Timken® tapered roller bearings. With Timken bearings, rolls stay in accurate alignment longer than is possible with sleeve type bearings. Gage uniformity is maintained throughout the length of the sheet, for sheet after sheet.

Roll neck wear is eliminated with Timken bearings because there's no friction between bearing and roll neck. Calenders maintain precision with fewer overhauls. Downtime is reduced because roll necks need no machining.

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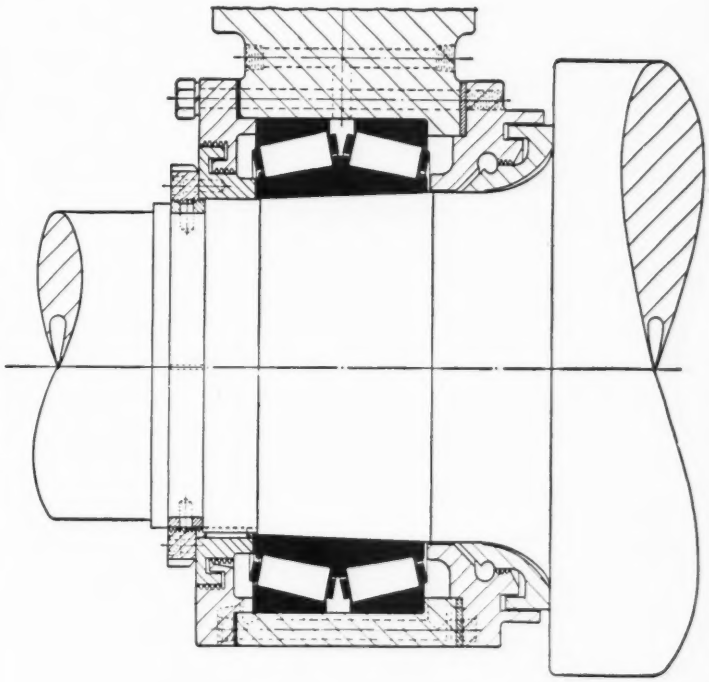

Diagram shows how calender rolls are mounted on Timken tapered roller bearings to maintain uniform gage of plastic film and rubber sheeting.

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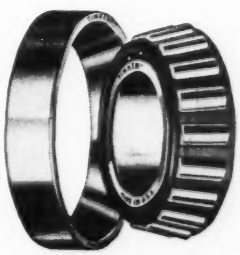
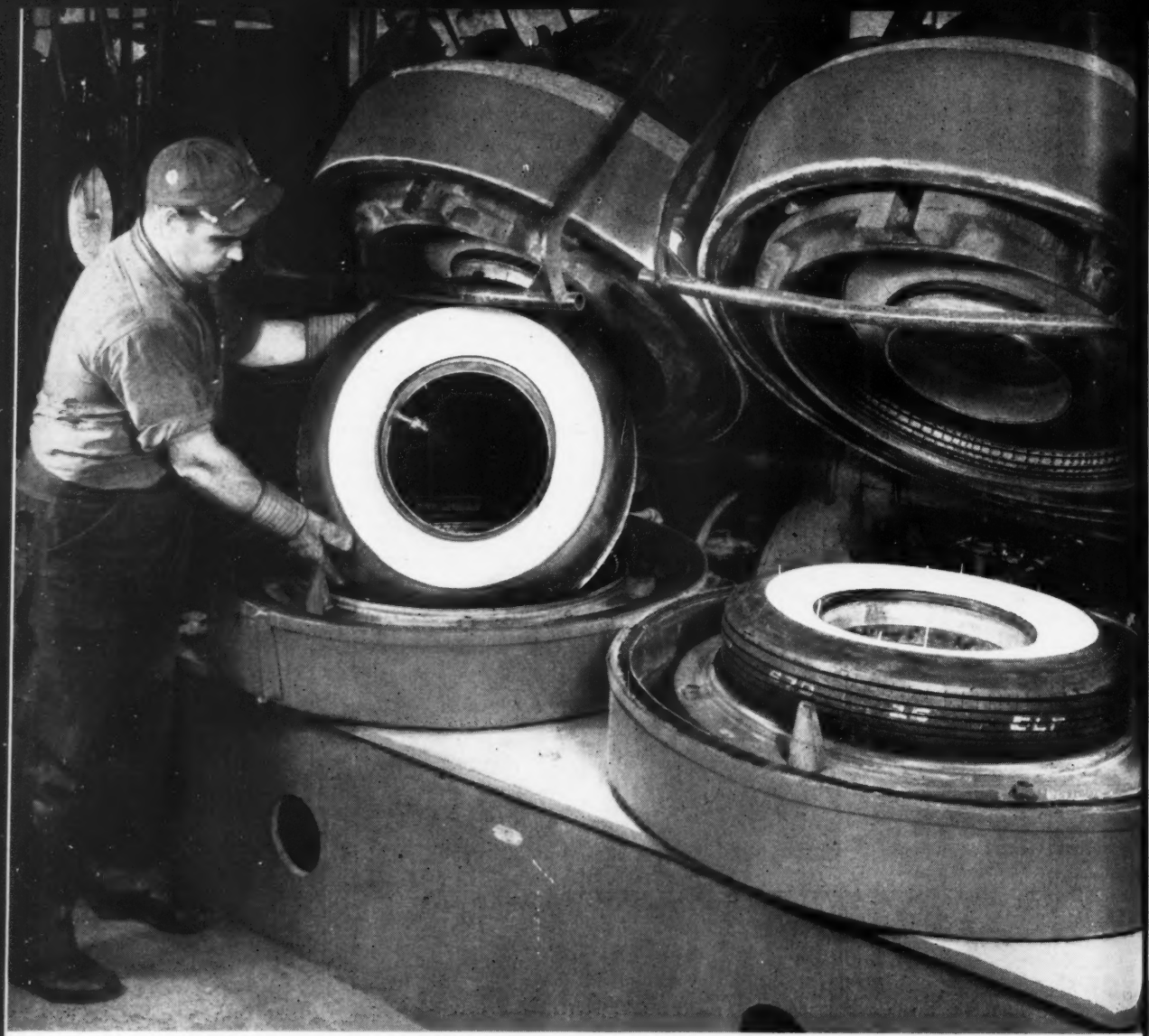


NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬭ AND THRUST ⬭ LOADS OR ANY COMBINATION



In processing, one of the country's large tire manufacturers has used Circo Light Rubber-Process Aid for white sidewalls for 13 years. Little or no staining occurs, because Circo does not migrate. Uniform results are obtained day after day, and production figures are regularly high, for Circo speeds milling time, furthers aging and curing.

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RUBBER-PROCESS AIDS

CIRCOSOL-2XH. An elasticator and process aid for natural rubber and especially for GR-S. Outstanding for sponge rubber.

CIRCO LIGHT PROCESS-AID. A processing agent and excellent softener for natural rubber, natural rubber reclaims, and neoprene synthetic rubber. Used for GR-S to some extent.

SUNDEX-41. A dark, free-flowing product that helps prevent scorching during mixing, milling and extruding of "cold rubber" treads and similar compounds. Contributes to improved wear resistance and flex life.

SUNDEX-53. An inexpensive product suitable for processing GR-S and blends of GR-S and natural rubber. An established process aid for rubber footwear stocks and semihard rubbers.

CIRCOMAR-5AA. A dark-colored product for processing natural and GR-S rubber used in tire-making. Also used in reclaiming natural-rubber scrap. Replaces asphalt fluxes. Free flowing at room temperature.

CIRCOMAR-25. A heavy, viscous, dark liquid softener of the asphalt-flux type for natural rubber, GR-S polymers, or blends of the latter with natural rubber. Used in the manufacture of tires.

SUNAPTIC ACID-130. For compounding neoprene latex. Replaces stearic acid as an activator. Functions also as a softener.

To reduce operating costs, this plant making rubber footwear ran comparison tests on 16 softeners for natural and GR-S stocks. Sundex-53 was selected. In fact, only one other product—at a much higher price—could compare with it at all in assuring proper resilience, required elongation.

A maker of rubber sponge had trouble with ordinary processing oils. They migrated, bloomed and affected his reclaim resin type adhesives. He found the answer to the problem in Circosol-2XH. The extra margin of safety in this Sun rubber-process aid has speeded production for him.

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$87,565, Addyston, O., $3,673,270, and Long Beach, Calif., $113,120; Catalin Corp. of America, Fords, N. J., $628,210, Goodyear Tire & Rubber Co., Akron, O., $1,762,000; Union Carbide, Marietta, O., $2,722,000.

Other Expansions

In addition to the styrene expansion indicated above, DPA also announced that it had issued certificates for rapid tax amortization to the following companies for construction of new facilities in line with DPA-authorized expansion goals in other types of materials used by the rubber and the plastics industries. The list follows, giving name of company, location of facilities, product or service, amount certified, and percentage of that amount allowed for rapid tax amoritization, in that order:

United States Rubber Co., Painesville, O., vinyl resins, $3,297,725 at 45%; Dow, Midland, vinyl resins, $4,387,600 and $5,920,000, both at 45%; and butadiene, $136,400 at 60%; at Freeport, Tex., vinyl resins, $5,930,000 at 45% and butadiene, $3,480,000 at 60%; Union Carbide, Texas City, Tex., vinyl resins, $13,837,000 at 45% and butadiene, $893,300 at 60%; B. F. Goodrich Chemical Co., Calvert City, Ky., vinyl resins, $5,871,100 at 45%; General Tire & Rubber Co., Calvert City, vinyl resins, $5,319,000 at 45%; Diamond Alkali Co., Deer Park, Houston, Tex., vinyl resins, $2,526,000 at 45%; Dewey & Almy Chemical Co., Cedar Rapids, Iowa, plastic packaging film, $1,732,000 at 50%; Firestone Tire & Rubber Co., Pottstown, Pa., butadiene and butylene, $961,500 at 60%; American Monomer Corp., Leominster, Mass., vinyl resins, $160,000 at 45%; Monsanto, Springfield, vinyl resins, $92,000 at 45%; National Starch Products, Inc., Plainfield, N. J., vinyl resins, $253,475 at 45%; Shawinigan Resins Corp., Springfield, Mass., $33,000, $100,350, and $919,600, all at 45%.

Between June 27 and July 3, DPA authorized the following additional certificates for expansion projects:

Firestone, Pottstown, vinyl resins, $6,022,700 at 45%; and Pathfinder Chemical, Point Pleasant, styrene resins, $2,397,560 at 45%.

London Rubber Meeting

The United States State Department, in late July had not yet named the American delegate to the conference opening July 30 in London, England, to discuss the feasibility of developing measures to cope with worldwide surpluses or shortages of synthetic or natural rubber.

As previously reported, the State Department abstained at the May Ottawa meeting of the International Rubber Study Group in voting on the Indonesian resolution calling for such a conference. The American delegation at Ottawa took the position that no workable agreement could be developed and that the efforts to do so are almost certain to fail.

Department officials met with State's rubber advisory panel in Washington in mid-July to get the industry's views on what position should be taken at the London meeting. It was reported unofficially that the meeting agreed that the American delegate should make no proposals, do very little talking. He will probably be instructed to do no more than take notes on what others say and submit a report to the Department at the conclusion of the conference.

Stockpile Loss

A considerable number of tons of stockpiled rubber was lost on July 11, according to a report from Clarksburg, W. Va., which stated that a fire there destroyed tons of crude rubber owned by the government. Damage was estimated "conservatively at $30 million."

The rubber was one of the major items in the warehouse facilities of the General Storage Co. in Clarksburg. Sparks from a welder's torch in the warehouse area were tentatively blamed for the fire.

Rubber Exports

OIT announced July 7 that it will permit the exportation of 2,500 long tons of butyl rubber in the third 1952 quarter. It said that easing of the supply of butyl now permits limited exports to be resumed after more than two years in which no butyl rubber was licensed for export.

OIT, in setting the third-quarter quota of 2,500 tons, informed exporters that they should apply for licenses on the regular license form IT-419. The agency said it will send each exporter whose application is approved an export license authorizing him to ship a specified quantity of butyl. Receipt of the license will entitle the exporter to apply to the RFC for a permit to purchase that quantity of butyl from an RFC plant.

In the first quarter of this year OIT established an export quota for GR-S, as the supply of that material eased up enough to permit more than token exports. The quota was upped to 17,000 tons in February, but actual purchases for export, despite many applications for licenses, totaled no more than 6,000 tons by the time April, and a new quarterly period, came. As a result, OIT put GR-S on general license in the second quarter, permitting unlimited exports.

Butyl is expected to make a better showing if the reports are true that European and other overseas rubber goods manufacturers are very anxious to get hold of some of this material. Currency difficulties, rather than a lack of interest in the material, were believed chiefly responsible for the failure of GR-S exports to measure up to the anticipated volume.

On July 3, OIT lifted export restrictions for a number of rubber items, except when destined for Hong Kong, Macao, and the Iron Curtain countries, where individual export licenses must still be obtained from OIT. Shipments to other countries may be made under "general license GRO," without prior application to OIT. The relaxation, ending the 18-month-old requirement of prior OIT authorization to export anyhwhere but Canada applies to the following items: reclaimed rubber and scrap rubber, camelback, and passenger-car tires and tubes (Schedule B Nos. 201100, 206905, 206210, and 206520). All other export controls on rubber and rubber products continue in effect.

OIT explained that demand for reclaimed rubber has eased substantially, and inventories are at a high level. Scrap rubber was placed under export licensing control last year to insure an adequate supply for reclaimers, but this supply problem no longer exists. Demand for camelback, it noted, has declined and is not expected to show much, if any, increase in the near future. Camelback inventories are at a new high. Production of passenger-car tires and tubes, OIT said, is high enough to meet domestic needs as well as the small export demand.

NAITD Suits

The National Association of Independent Tire Dealers and other plaintiffs dismissed their anti-trust suit against The B. F. Goodrich Co., Gulf Oil Corp., and Gulf Tire & Supply Co. The order dismissing the suit "without prejudice" (plaintiffs can reinstitute it if they wish) was signed by U. S. District Court Judge David A. Pine on July 9.

At the same time NAITD announced that a similar settlement of its companion suit brought in 1948 against The Rubber Manufacturers Association, Inc., the tire industry's Big Four companies, plus General Tire, is "awaiting final court approval." Attorneys for both sides worked out the terms of settlement over the past year. The suit charged the defendants with conspiring in a number of practices violating federal anti-trust laws, both the Clayton and Sherman acts.

NAITD said it agreed to drop the first stuit because it believes that the quantity discount limit rule promulgated early this year by the Federal Trade Commission will solve the major problems complained of in the court action. The tire industry's request that the courts throw out the Commission's ruling is still before District Court Judge Walter Bastian, and it is doubtful whether he will rule on the issue, or schedule hearings, before autumn. Meanwhile the Commission's ruling is not in effect.

The suit dismissed last month charged that the defendants since 1940 "engaged in a program to induce Gulf dealers to purchase tires exclusively from Gulf and have thereby attempted to monopolize and have monopolized the distribution of tires to such dealers . . . ." Other charges were: Goodrich sold tires to Gulf at prices substantially less than those charged by Goodrich to other tire distributors; Gulf, with the approval of Goodrich, forced Gulf dealers to buy tires exclusively from Gulf; and the discrimination in prices and the forcing of Gulf dealers to buy exclusively from Gulf had injured, destroyed, and prevented competition between the defendants and tire distributors. The plaintiffs asked the Court to require that these alleged practices be stopped.

—A. J. K.

Labor News

Negotiations which began between the representatives of the Big Four rubber companies and representatives of the United Rubber Workers during June and July on the matter of new wage and/or contract provisions had not produced much in the way of results by the third week in July.

Talks between Goodrich and the URWA, which began in Cincinnati, O., June 9, which covered both wages and working conditions, were said to have made very little progress near the end of July. The present contract expired on July 15, but was being renewed on a day-by-day basis while the negotiations continued. On July 16 it was announced that the local URWA union at the Goodrich plants had voted strike authority to the union, but there were no indications that the authority would be used in the immediate future.

Firestone and the union began their talks in Columbus, O., on June 23. Both working conditions and wages are being discussed in these negotiations.

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A small army of ever-active destructive forces works constantly to shorten the life of plastic garden equipment the moment it goes into use. The scorching rays of the sun . . . the cutting abrasion of dirt . . . the drying effect of heat . . . the constant flexing of normal use . . . the punishing blasts of winter . . . the continual extraction by water—all contribute to gradual deterioration. In just such applications, Plastolein 9720 proves its superiority in so many ways. It gives you extremely low volatility, outstanding low-temperature flex, excellent heat and light stability, extreme resistance to hot and cold water and oil extraction, and excellent "hand." *Where durability counts* . . . be sure to specify Plastolein 9720 Polymeric which offers outstanding resistance to the normal ravages of time and use.

New $2,000,000 Ozone-Oxidation Plant to make more and purer Azelaic and Pelargonic Acids

Emery's new plant, now under construction, will add considerably to the present volume of Plastolein Plasticizers derived from Azelaic and Pelargonic Acids. Furthermore, new ozone-oxidation process will reduce costs substantially!

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Goodyear and URWA started their talks in Cleveland, O., on June 27, but in this instance the wage issue was the only matter open for discussion. There were some indications that the union planned to concentrate on one company as far as wages were concerned, and that that company might be Goodyear. A settlement would aid the union in its negotiations with the other Big Four companies.

New York, N. Y., was the site of the talks between U. S. Rubber and URWA, and these negotiations began July 7. The contract with this rubber company ends on July 26, unless renewed.

The union was reportedly having some difficulty establishing a case for a wage increase in the face of the small increase in the cost of living since the last wage increase and the fact that the effect of the steel strike on automotive production had reduced the demand for many rubber products. Many plants were having difficulty finding employment for all their workers under existing conditions.

All the talks were proceeding peaceably, however, and some progress was expected by August 1.

EAST

Du Pont Sesquicentennial

The program for the celebration of the one hundred fiftieth anniversary of the founding of E. I. du Pont de Nemours & Co., Inc., on July 18, at the site of the company's first mill on Brandywine Creek, near Wilmington, Del., included a historical dramatic prologue depicting the company's founding, and speeches by Henry B. du Pont, vice president and member of the executive committee; Crawford H. Greenewalt, president; and Walter S. Carpenter, Jr., chairman of the board.

An audience of about 7,000 people, mostly active and retired du Pont employes and members of the du Pont family, was present. The du Pont band, of 60 employes under the direction of Frank A. Cianflone, played before and after the program. The du Pont chorus sang the closing music.

Before the ceremonies, guests inspected the ground floor of "Eleutherian Mills," the house into which E. I. du Pont and his family moved in 1803; the company's first office building; and the small stone house where the founder and his family lived during their first summer in Delaware.

Henry du Pont, speaking of some of the men and women who contributed to the company's growth and success, observed that of the company's ten presidents since 1802 four were present at the ceremonies: Pierre S. du Pont, Irenee du Pont, Mr. Carpenter, and Mr. Greenewalt.

Mr. Carpenter dedicated a seven-ton millstone resting on a granite base on which had been mounted bronze plaques designed and executed by Domenico Mortellito, Wilmington sculptor.

Mr. Carpenter said that the stone "will commemorate, not only today, but for many years to come, the services of those thousands of men and women who have preceded us; who are here today; and who will, in turn, succeed us. And to that end there has been inscribed upon this monument the following: 'On this site in 1802 the du Pont Company was conceived. It has grown with the growing nation under a system dedicated to freedom. Its greatest asset has been all its people, and its guiding philosophy that there is no privilege that is not inseparably bound to a duty.'

"Just as this very wheel served many years ago to mix the three ingredients required to make the company's first product," Mr. Carpenter continued, "so now it symbolizes the three components which were essential to the success of this entire enterprise: namely, work, tools and leadership. Each of these components expresses the contribution by people at all levels in the organization. The tools were supplied for use and risk in this enterprise through the savings of many people. The leadership was furnished by the intelligence, courage and initiative of people dedicated to a common cause. No one of these three stands alone; each merges with the other until they become a whole, intimate and inseparable."

Mr. Greenewalt, in his talk, said the "vast unexplored area of science" opened up by advancing technology is a "new continent" fully as rich and as abundant as the geographical America of 150 years ago and "as full of promise for the future." The possibilities in "increased productivity alone" from this world of science "are enough to expand our standard of living substantially beyond its present high level," he predicted.

To meet the challenges of the great new world of science, he added, "we must face them as the men and women of Irenee du Pont's time faced theirs—with the same venturesome spirit, the same zeal, and the same determination. And it follows that we should and must have the same conditions that nurtured this spirit—the same freedom, the same incentive, the same spur to initiative."

Du Pont also marked its one hundred fiftieth anniversary year with the publication of a handsome, illustrated book, "Du Pont—The Autobiography of an American Enterprise." The theme of the book is the parallel development of the du Pont company and the nation over a century and a half. Largely pictorial, with many illustrations in color, the book relates the company's activities and operations to broad economic and social developments in the United States.

Advanced by General Tire

Promotions of four men in the factory organization of The General Tire & Rubber Co., Akron, O., were announced recently by Factory Manager H. J. Harmon.

Robert E. Rehm, manager of quality control, was made production manager of the Akron plant. William S. McCormick, Jr., a production engineer, replaced Rehm as manager of quality control.

William Yurkowsky, Jr., is the new manager of quality control at General's Waco plant. James A. Rankin succeeded McCormick as production engineer for passenger tires in the technical department.

Rehm started on General's technical training program February 14, 1949, and was advanced to the position of manager of quality control in the early part of 1950.

McCormick came to General as a technical trainee August 14, 1950, and was transferred to the technical department as production engineer for passenger tires on November 1, 1951.

Yurkowsky has been a technical trainee since coming to General on April 2, 1951.

Rankin, another trainee, began with General a year ago.

The creation of the position of comptroller of sales and distribution costs for General Tire and the appointment of John C. Ink to that new assignment were announced last month by M. G. O'Neil, executive assistant to the president.

Ink, formerly manager of sales operations, will now coordinate all sales and distribution costs for all divisions and departments of the company and will also continue those of his present duties which include administration of basic price structures in the tire field, as well as his industry and government committee activities. Now in his twenty-eighth year with General, Ink has occupied a wide variety of executive sales positions, including manager of passenger-car tire sales.

Functions of Ink's new department will include assistance in preparation of budgets, keeping the department heads advised concerning performance and savings possibilities, and outlining steps for the elimination of unnecessary expenses.

M. E. Majors, manager of the car-dealer sales for the Detroit division, has been named regional manager of car-dealer sales for the central region, which embraces the Buffalo, Akron, Cincinnati, St. Louis, Chicago, Minneapolis, and Detroit divisions. Majors will operate out of the Akron office. A General employe for 28 years, he has been associated with the rubber industry since 1919. He operated General Tire distributorships from 1924 through 1934 in St. Louis and Kansas City. Manager of General's fleet sales until the outbreak of World War II, he served as a major in the Air Force for three years.

Claude S. Thompson has been promoted to southern regional manager, car-dealer sales. The southern region is composed of the Atlanta, Dallas, Houston, Kansas City and Memphis divisions. Thompson, a veteran in the tire industry, has been with the General Tire sales organization since 1940. He was made eastern display merchandising manager in 1941 and in 1945 was advanced to the car-dealer sales division.

Herbert R. Jordan has been advanced to manager, dealer relations in the Akron plant, replacing J. J. Denbrock, who is moving to the plastics and special products sales division. Formerly territory sales manager of the Hudson Valley area in the New York sales division, Jordan now will direct all dealer relations at the home office. He came to General as assistant to the regional manager of the eastern division in 1949.

The name of Thomas S. Lee Enterprises, Inc., has been officially changed to General Teleradio, Inc. This firm is a subsidiary of General Tire and includes all of the company's interests in radio and television.

Motors Specialties Corp., 12255 E. Eight Mile Rd., Detroit, Mich., has changed its name to Beck Products Corp. Officers, directors, and personnel remain unchanged.

Which of these → production problems is costing you money?

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2. ☐ Heat build-up
3. ☐ Tear resistance
4. ☐ Crack growth resistance
5. ☐ .....

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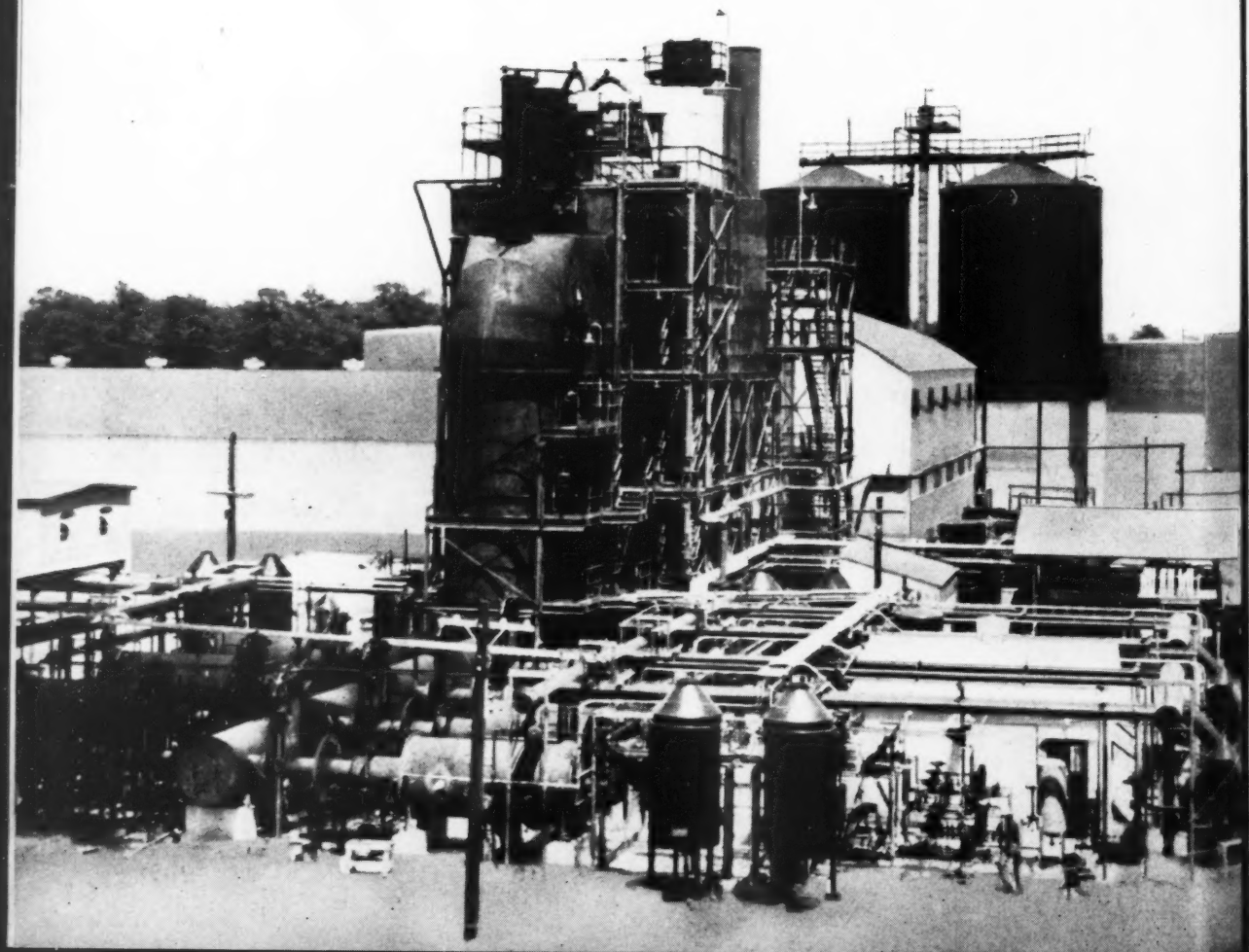

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HAF

new facilities are in operation almost doubling production of this superior quality black

Witco-Continental's new plant at Westlake, La., celebrated its first anniversary with production of Continex HAF nearly doubled.

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Barrett Opens New Applications Research Laboratory

A new laboratory, specially designed to develop and test materials and processes used in the manufacture of rubber products, plastics, paints and varnishes, paper, laminates, insulating materials, and a wide range of other products was opened on July 11 at Edgewater, N. J., by Barrett Division, Allied Chemical & Dye Corp.

Executives of customer concerns, representatives of the technical press and neighboring industries, local officials, and other invited guests as well as executive staffs of Allied Chemical and its six divisions were shown the new facilities.

The new laboratory, known as the Shadyside applications research laboratory, will be in charge of D. A. Rankin. Containing extensive testing as well as actual production equipment, the laboratory will enable Barrett technicians to develop, test, and evaluate, under simulated production conditions, Barrett materials used in the manufacture of rubber, plastics, paper, and other products.

Complete equipment for processsing and testing natural rubber and synthetic elastomers formulated using rubber compounding materials manufactured by Barrett is housed in the new laboratory, and some of this equipment and T. A. Builifant, group leader in charge of rubber applications research, are shown in the accompanying illustration.

Machines and instruments are also available for determining all of the properties and characteristics of rubber important to its use in consumer goods such as tires, tubes, tape, heels, soles, footwear, automotive, aviation, and other mechanical rubber goods, etc. There are two abraders, a Goodyear-Healy rebound tester, sources of ultra-violet and infrared light for measuring stability to light, constant temperature ovens, and a variety of flexing machines (Ross, De Mattia, and Goodrich flexometers).

Of special interest is the modern tensile testing equipment. Besides two Scott tensile testers, normally used for testing rubber and rubber-like materials, the new Barrett laboratory has a new electronic tester, the Instron, which can be used to test within narrow limits and over a wide range.

A special feature of the laboratory is that both Instron and Scott testers are kept in a constant-temperature room, which provides for greater accuracy of such testing. A fourth tensile testing instrument is designed specifically for testing at high and low temperatures and can be used from —70 to +300° F.

There are also complete facilities for testing electrical properties, including a 150,000-volt transformer used in dielectric strength measurements.

Barrett products for the rubber industry include compounding, dispersing, and reclaiming oils and softeners, the Cumar reinforcing resins, Carbonex compounding hydrocarbons, and ester-type plasticizers, as well as a wide range of other coal-tar products for the chemical and other industries.

Thomas Carew

A Section of the New Barrett Shadyside Applications Research Laboratory Showing Some of the Equipment Used for Rubber Processing; T. A. Builifant May Be Seen in the Foreground

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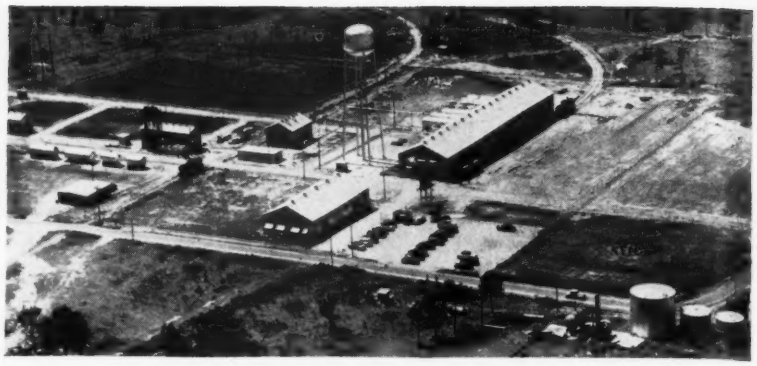
Haartz-Mason, Inc., Watertown, Mass., on July 1 announced the election of Jesse H. Mason as chairman of the board; Nehemiah Boynton, Jr., as president; and Laurence R. Clarke as vice president in charge of production.



New Thiokol Liquid Polymer Plant at Moss Point, Miss.

Thiokol Opens New Plant

The Thiokol Corp., Trenton, N. J., has announced production at its new plant at Moss Point, Miss., located on the Gulf of Mexico between Biloxi, Miss., and Mobile, Ala., on the Pascagoula River.

Original plans called for the construction of a raw material plant to produce bis (2-chlorethyl) formal. These plans were modified to provide for a liquid polymer plant necessitated by increased demands for these materials for military and civilian uses. The plant, built at a cost of $1 million, has approximately 15,000 square feet of production area and is shown in the accompanying illustration.

Decisive factors in the selection of Moss Point for the plant site were adequate water and power, adjacent navigable river, and excellent rail and trucking facilities. The proximity of the raw material source made this geographical location an ideal manufacturing site. The layout and the design of the various units of the plant incorporate the most modern equipment and the flow, heat, and other control devices used, permit almost automatic operation with the minimum of staff workers.

The plant is expected to add appreciably to the company's output of "Thiokol" liquid polymers as well as to the output of one of the base raw materials formerly purchased from other sources. Adequate supplies of "Thiokol" liquid polymers for both civilian and military uses should now be assured.

Carbide & Carbon Chemicals Co., a division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y., has appointed John Conway, J. A. Field, and W. A. Woodcock assistant managers to R. L. Bateman, manager of the company's fine chemicals division. Mr. Conway was formerly product manager in charge of nitrogen, chlorine, and sulfur compounds; Mr. Field was product manager for intermediates, and M. Woodcock was product manager for plasticizers, solvents, and resin stabilizers.

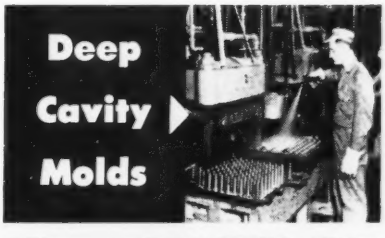
The recent announcement of Carbide's new coal-hydrogenation plant with its expected flood of new chemicals, accentuates the demands to be placed on this division whose job it is to advance new materials from sample distribution to tank car sales. These new appointments represent a delegation of responsibility for sales development work caused by the large increase in new materials during the past few years and in view of the expected increase in the future.

Easy release and clean molds with DOW CORNING Mold Lubricants

Production has gone sky-high since the company switched to Dow Corning Silicone release agents, and Moe Muscles never had it so good. Inspector Mike can't quibble, either. Molded parts are cleaner than ever before. Sharp, uniform detail, closer tolerances and high surface finish have become commonplace. Scrap has dwindled away to the vanishing point.

Mike knows that other production costs have dropped off, too. Molds stay clean from 5 to 20 times longer than when lubricated with ordinary release agents because Dow Corning silicones can't break down to form a carbonaceous build-up on mold surfaces. Cleaning schedules are reduced, service life is lengthened and maintenance costs are cut by as much as 80%.

For easier release and lower costs, specify Dow Corning silicone mold release agents: emulsions for molds and curing bags; fluid for green carcass, bead and parting line release.



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Goodrich Appointments

William W. Scull, general manager of manufacturing services of The B. F. Goodrich Co., Akron, O., since 1947, has been named director of purchases and traffic to succeed Elmer A. Stevens, who becomes treasurer of the company on September 1.

Scull joined Goodrich in 1929 and served in the purchasing and sales divisions until World War II, when he was named chairman of the purchasing committee composed of rubber company representatives responsible for obtaining materials to build and equip the plants for the nation's manmade rubber program. In 1944, Scull was made manager of the government rubber-making plant in Port Neches, Tex., built and operated by Goodrich. He was later transferred to Louisville, Ky., as manager of a similar plant there built and operated by his company. He became production manager of plants operated by B. F. Goodrich Chemical Co. in 1945 and two years later was named general manager of manufacturing services division with headquarters in Akron.

Harold W. Catt, with the purchasing division since 1940, has been named general purchasing agent. He was manager of textiles, paper products, and advertising purchases in the purchasing division. Catt joined Goodrich in 1929 and was on the technical staff until 1940. He became manager of chemical and pigments purchasing in July, 1944.

Thomas C. Yarnall has been appointed central division manager for the replacement tire division; while William R. Meyer, formerly general supervisor, succeeds him as Detroit district manager.

Yarnall has been with Goodrich for 24 years and for the present will continue his headquarters at Detroit, where he has been manager since 1948. He is replacing A. C. Kelly, who is retiring next month after 37 years with the company.

Meyer joined Goodrich in 1928 and spent a major portion of his career in the Chicago district, serving as credit and operating manager, store manager, district office manager, and later as store supervisor before moving to Detroit as general supervisor.

Several changes in executive positions for the associated tire and accessories division were announced last month.

R. W. Charlton has been appointed New England district field manager, succeeding Walter R. Miner, who is retiring for reasons of health; and J. Paul Stanley becomes Cleveland district field manager.

Charlton, in the Cleveland sales area for the past six years, will be in charge of marketing activities in the New England states for Hood, Miller, Diamond, and Brunswick lines of tires and tubes, and Miller automotive accessories.

Stanley was field manager of truck tire sales for the associated lines tire division for the past 2½ years. He will headquarter in Akron.

Miner has been with Goodrich since 1923 and has made his home in Boston since 1946. He will continue to be active in the tire business through an interest in Shanahan Tire Co., Boston area distributer for Miller and Hood tires.

Fred C. Schulz has become Pacific Coast manager for the division, succeeding the late K. K. Kantzer. For the past 2½ years Schulz was manager of sales development for associated lines, with headquarters at Akron. Prior to that assignment he had been operating manager for the division since 1946. He has been with Goodrich since 1935.

Don W. Gates has been appointed merchandising manager. With the company since 1939, he started in Denver, Colo., as sales promotion man and came to Akron in 1942 to assume sales promotion duties. Called into Army service in 1943, he returned to the company in 1946 and joined associated lines' advertising staff, becoming manager of advertising and sales promotion for that division in December, 1948.

Grover C. Clark succeeds Gates in the latter capacity. Clark started in the replacement tire sales division in St. Louis in 1939. He came to Akron in 1942 and entered military service soon after. Returning to Goodrich in 1946, Clark joined associated lines to handle sales promotion activities 2½ years later.

A new steam generating boiler unit is being installed at the Goodrich plant in Akron. The boiler has nearly 60,000 lineal feet of steel tubes that rise 38 feet above a floor area 27 feet square. Once in use, boiler temperatures will range between 2,000-2,500° F. Said to be Ohio's largest spreader stocker fired steam-generating unit, the boiler will provide a continuous output of 200,000 pounds of steam per hour at 250 psi. pressure and a temperature of 525° F. The new unit and the building to house it represent an investment of $750,000.

Takes on Gilmer Line

New York Belting & Packing Co., Passaic, N. J., has joined forces with L. H. Gilmer Co., Tacony, Philadelphia, Pa. The new organization will continue to operate and be known as New York Belting & Packing Co., maintaining a century-old policy of selling to industrial consumers and dealers exclusively through established distributors with protected territories.

The familiar Gilmer products including V-belts, flat belts, "timing" belts, and shock pads, will retain the Gilmer name and will be sold by the new organization.

New York Belting & Packing has been a major factor in the field of mechanical rubber goods sales for 107 years. With the acquisition of the well-known Gilmer line the company will be able to offer its distributors one of the most complete lines of quality mechanical rubber goods in the industry.

B. F. Ruether, vice president of New York Belting & Packing, will be in charge of the expanded organization.

New Adhesive

Pioneer Latex & Chemical Co., Middlesex, N. J., has developed a new adhesive that permits the installation of rubber tile on grade concrete. This adhesive, called Chem-Set, combines a specially formulated latex and a powdered catalyst vulcanizer and gives an effective chemical bond between rubber tile and concrete even in the continuous presence of moisture. The adhesive film does not soften or saponify in the presence of moisture and the alkali normally present on a concrete floor, it is further claimed. According to S. G. Paliska, company president, the first test installation of rubber tile on grade using Chem-Set has now been laid for nearly two years, with completely satisfactory results. Approximately 500,000 square feet of such installations are now in service.

Badenhop Anniversary

On July 17, Robert Badenhop, chairman of Robert Badenhop Corp., Woolworth Bldg., New York 7, N. Y., celebrated his fiftieth anniversary in the crude rubber business. Mr. Badenhop was born in Hamburg, Germany, in June, 1882, and, therefore, also celebrated his seventieth birthday on June 12.

Mr. Badenhop entered the crude rubber business in 1902 in Europe and in 1907 came to New York as assistant to the manager of a crude rubber import house closely connected with a Hamburg firm. In 1909 he established his own firm in New York as rubber importer and broker, and the firm in 1924 became the Robert Badenhop Corp., one of the largest in the business.

At the time Mr. Badenhop became connected with the crude rubber business in 1902, rubber goods manufacturers still had to rely for their main supply on wild rubbers; plantation rubbers were just beginning to be known. He was one of the pioneers in advocating the formation of The Rubber Trade Association of New York in order to establish trade rules and a uniform contract, which provided for the settlement of disputes by arbitration. He was president of RTA from 1936 to 1938. Mr. Badenhop is also a founder member of the Rubber Exchange, now part of the Commodity Exchange, and he has for a number of years been president and chairman of the Commodity Exchange Rubber Clearing Association.

Harry J. Braker, chief rubber inspector, and George R. Mahoney, traffic manager, have been associated with Mr. Badenhop for 42 and 33 years, respectively.

Promoted by Seiberling

Two promotions in the service department of Seiberling Rubber Co., Akron, O., have been announced by L. M. Seiberling, vice president in charge of sales.

William E. Cowell becomes manager of the department, succeeding O. K. Feikert, who resigned to enter private business.

K. P. Parks has been named assistant department manager.

Cowell joined Seiberling on October 27, 1926, as an employe in the by-products department. He was also shipping clerk in the company's Buffalo, N. Y., office, and worked in merchandise distribution 22 years. Cowell transferred to the service department a year ago.

Parks started with Seiberling's service department in 1943.

Madden with Caldwell

Joseph P. Madden, assistant sales manager of Stauffer Chemical Co., New York, N. Y., has resigned to become vice president and a director of Caldwell Chemical Co., Inc., a manufacturers' representative and distributor of chemical products, with offices in New York, Detroit, and Portland, Oreg. Mr. Hadden joined Stauffer 19 years ago in the accounting department, but was transferred to the sales staff in 1933. Seven years later he became head of the Philadelphia sales territory and in 1942 was brought back to the New York office as assistant sales manager in charge of alkalies chlorine, and chlorinated products.

Whatever your roll requirements—whether for conventional applications or for special or unusual ones—consult us.

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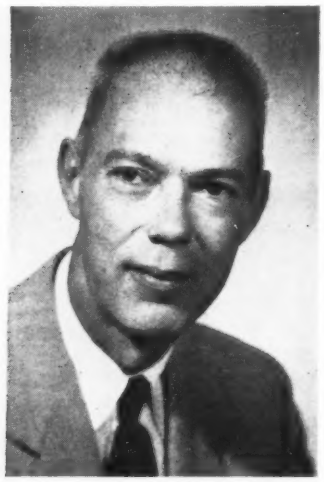
Reynolds Promoted

Downing P. Brown, vice president in charge of sales of Brown Co., 150 Causeway St., Boston 14, Mass., has announced the appointment of John G. Reynolds as advertising manager of Brown Co. and its Canadian subsidiary, Brown Corp. Mr. Reynolds has been a member of Brown Co.'s sales force for the past 12 years in the Nibroc towel division covering the New England area. He was associated with a Boston advertising agency until 1940, when he joined Brown Co. He served 48 months at sea during World War II and rejoined Brown in January, 1946.



John G. Reynolds

New Snell Executive

Foster D. Snell, Inc., firm of consulting chemists and engineers, 29 W. 15th St., New York 11, N. Y., has added to its staff, as director of package engineering, Walter L. Hardy. He had served previously as vice president of the specialty package division, Leeds Sales Corp., and as manager of package development with Shellmar Products Corp. During the late war he was a lieutenant colonel with the U. S. Army Air Forces, Engineering Division, at Wright Field, where he was responsible for the resarch and development of packaging procedures and material. He is also the author, or co-author of 58 specifications and numerous technical directives on protective packaging materials and procedures and is a member of various government and industrial committees and professional societies.

The addition of a packaging engineering division to the Snell organization will expand the scope of its services. To the present activities of the company in food technology, rubber and plastics, paints and varnishes, detergents, adhesives, chemical specialties product evaluation, and market research can be added the necessary package design and technology.

The new division will also conduct research and development on packaging materials and procedures, corrosion and its prevention, prevention of mold and fungus deterioration, shock and vibration studies, package and package material evaluations. A completely equipped laboratory has been established.

New Research Director

George S. Bachman has been made director of research of the new fiber glass division of Pittsburgh Plate Glass Co., Pittsburgh, Pa. He joined the company during 1947 and since then has been associated with the glass division's research laboratories at Creighton, Pa. Prior to his association with Pittsburgh Plate, Dr. Bachman had been a ceramic engineer wih Owens-Illinois Glass Co. During three World War II years he had served in the U. S. Army's Chemical Warfare Service.

As director of research, his headquarters will be at Shelbyville, Ind., where production facilities and laboratories are being installed for the production of strand and superfine fiber glass. Initial production from the plant is expected within the next few months.

Erie Foundry Co., Erie, Pa., has appointed James A. Currie vice president and general manager, and Macdonald S. Reed vice president and chief engineer.

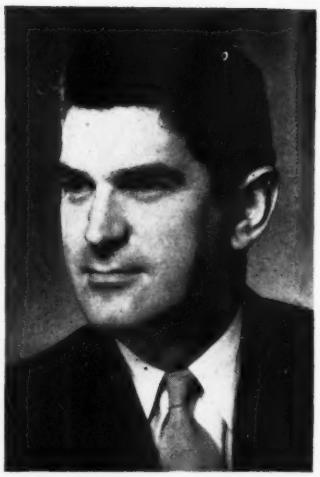
Edward V. Osberg

Osberg in New Post

National Polychemicals, Inc., 131 Clarendon St., Boston, Mass., has appointed Edward V. Osberg general manager to direct the firm's overall activities.

National Polychemicals was recently formed to manufacture and sell specialty organic chemicals. The new company is selecting a plant site near Boston and expects to have operations under way within a year. The firm's activities will be centered in several related chemical fields and details will be announced later. Plans are under way to organize a research and development group, and emphasis will be placed on new product development.

Osberg comes to National Polychemicals from The General Tire & Rubber Co., where he served as assistant manager of the chemical division. Prior to that he had been vice president of Wilmington Chemical Corp. and earlier, editor of India Rubber World. Osberg is a member of the American Chemical Society, the American Institute of Physics, and the Chemists' Club of New York.



Lewis B. Smith

L. B. Smith Promoted

J. M. Hamilton, vice president of Binney & Smith Co., 41 E. 42nd St., New York, N. Y., has announced the transfer of Lewis B. Smith from the technical service department to the sales department in the capacity of assistant sales manager, specialty blacks division.

"We believe good sales service is a basic obligation of a sales organization such as ours and is benefited by technical men," Mr. Hamilton said in announcing creation of Mr. Smith's new post.

Mr. Smith joined Binney & Smith in November, 1949, as a technical service representative in the non-rubber division. He was associated with the research department of C. K. Williams & Co. until September, 1942, when he entered military service. On his return to civilian life in 1946, Mr. Smith joined the Calco Chemical Division of American Cyanamid Co., where he later became assistant production superintendent of the titanium dioxide plant at Gloucester, N. J.

Consolidating Activities

Consolidation of all sales activities for molding and extrusion plastics sold by Bakelite Co., a division of Union Carbide & Carbon Corp., 260 Madison Ave., New York 16, N. Y., was announced July 9 by George C. Miller, vice president in charge of sales.

John D. Benedito has been appointed manager of the new molding and extrusion materials department and will be responsible for the sale of all molding and extrusion materials, including phenolics, polystyrene, polyethylene, and vinyls used for these applications.

David A. Munns has been named manager of the molding and extrusion materials division that will function as a part of Mr. Benedito's new department, which will also supervise activities of the wire and cable division headed by J. E. Brister.

In making this announcement, Mr. Miller stated that the creation of this new molding and extrusion department is another step in the recently initiated program to consolidate the company's sales activities. Prior to this program sales activities were carried on by two separate groups known as the thermoplastics department and the thermosetting department.

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Laboratory-tested and factory-proved, this new resin shows remarkable properties where it counts most—in the factory and in competitive compounds.

For example, in one SM sole stock 30% of the high styrene resin was replaced with Polymel C-130, thus materially reducing the cost of the stock. This factory stock processed exceptionally well, showed good dispersion of the ingredients, had higher hardness and tensile than the original compound *and showed a 3-to-1 increase in flex life!*

These are typical of factory runs with POLYMEL C-130. In addition, its low melting point of 210°F makes it an excellent plasticizing-processing resin for short cycle batches.

POLYMEL C-130 is low priced and readily available. If you haven't done so yet, send for your sample today, or, better yet, ask for a sample and order enough for a trial run in your plant. You'll be gratified with the results.

Prices 19½¢ lb.—1000 lbs. to a carload
20½¢ lb.—under 1000 lbs.
fob factory in drums

Send for your sample today!

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Sargent Elects Officers

At a special meeting of the stockholders of C. G. Sargent's Sons Corp., Graniteville, Mass., held recently following the death of the company's president, A. C. Sargent, the following officers were elected: president, Mrs. Harriet Sargent Hildreth; treasurer and general manager, F. Stanley Smith; assistant treasurer and clerk, Raymond D. Tellier.

The company is observing its hundredth anniversary of manufacturing textile and special washing and drying machinery for industry, this year, having been established in 1852 by Charles G. Sargent, father of the company's late president.

Thermoid Hose Tester

Thermoid Co., Trenton, N. J., has designed and built a machine for testing automobile radiator hose, six at a time, for resistance to flowing liquids, under various conditions of pressure and temperature, while being oscillated to simulate auto vibration. Built under the direction of Wilbur Huff, the hose tester was placed in operation in the company's physical testing laboratory on May 28. Readily adjustable to test a wide range of hose diameters, lengths, and curvatures, the machine is six feet long, four feet wide, and five feet high in minimum dimensions.

The liquid under test is heated in a 10-gallon tank to any predetermined temperature up to 220° F., and pumped under suitable pressure to an upper manifold having six outlets, each controlled by a gate valve. The hose specimens are attached to each of the upper and lower manifold outlets, the latter also equipped with individual valves, so that the test liquid is conveyed by the hose specimens from the upper to the lower manifold. The upper manifold is built to provide a vertical adjustment range of 18 inches, a horizontal range of 12 inches, and angular adjustment of 180 degrees to the lower manifold. The lower manifold is mounted on two revolving disks drilled to provide five increments of eccentric motion to the manifold. A wide range of rotational speeds can be obtained by simple pulley changes, and additional rotating disks are available to provide other degrees of eccentric motion.

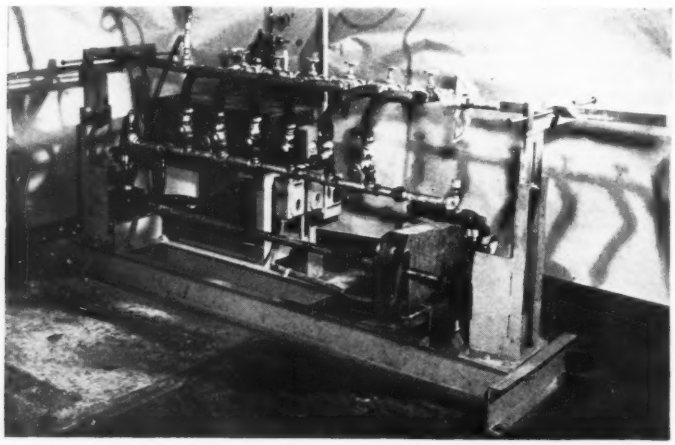
Since six hose of the same type can be tested at one time under identical conditions, the average performance of a given hose can be determined with an accuracy not obtainable with single-specimen testing. Built at an estimated cost of $3,000, the new machine will be used in developing new hose constructions, designs, and rubber compounds to resist corrosion from anti-freeze liquids and structural failure from automobile vibration.

Material Handling Education Committee

In order for engineering students better to equip themselves for future service in the growing field of materials handling, the 78 major manufacturers of materials handling equipment, acting through the Material Handling Institute, and the 3,000 engineers who are members of the American Material Handling Society have joined with leaders in the field of engineering education to form an autonomous College-Industry Committee on Material Handling Education.

The Committee's work will be dedicated to the following five objectives: (1) make information for courses on materials handling available to colleges and other study groups; (2) initiate the development of new information for use in such courses; (3) provide a source of information for materials handling courses; (4) promote the teaching of materials handling in colleges and universities; and (5) determine from industry what requirements are needed in materials handling engineers graduating from college. The Committee held its organizational meeting in New York, N. Y., late in June and appointed task groups which will report at the next meeting in Cleveland, O., in the fall to assess costs, plan financing, select a permanent chairman, and outline a work program.

Tyer Rubber Co., Andover, Mass., recently broke ground for a new factory building adjacent to the existing buildings. Scheduled for completion by the end of the year, the new structure will be two stories, occupy a space of 75 by 240 feet, and have a total of 36,000 square feet of floor space. Besides housing an improved and more complete laboratory, the new building will provide additional facilities for the manufacture of special rubber products and for the expanding production of established items.



Radiator Hose Testing Machine Designed and Built by Thermoid Co.

Bradley Promoted

D. F. Bradley

Shell Chemical Corp., 50 W. 50th St., New York 20, N. Y., has made D. F. Bradley manager of its Detroit district sales office to succeed W. E. Keegan, now assistant to the vice president, marketing. Bradley began his association with Shell Chemical in the Detroit office in 1947 as a technical salesman. From there he moved to the New York office as manager of the solvents department of the eastern division. His new responsibilities will center on the marketing of Shell Chemical's organic chemicals, including solvents, industrial chemicals, and resins and plastics. Bradley was associated with United States Rubber Co. and Bradley Concrete Products Co. prior to joining Shell Chemical.

In Patent Suit

Plax Corp., Hartford, Conn., has consented to the posting of a $25,000 bond by Elmer E. Mills Corp. which will stay execution of an injunction ordering Mills to stop manufacturing plastic bottles. Plax recently won its suit against Mills for patent infringement, but the latter plans to appeal the decision. The injunction was ordered in a judgment by the Sixth District Federal Court of Northern Illinois, which also ordered the recovery by Plax of damages and of three-fourths of court costs. The judgment held that Mills has infringed eight out of 11 claims in three of four Plax patents covering plastic bottle manufacturing processes.

Plax Erecting New Plant

Plax, a manufacturer of squeeze bottles and other plastic products, has started construction of a new plant in the Shively section of Louisville, Ky. The Plant, which will be taken on a long-term lease, will have 30,000 square feet at the outset.

The company has been periodically expanding its production facilities over the past several years. This move gives it a midwestern factory for the first time.

Actual production of polyethylene sheet and Layflat tubing and of plastic bottles is expected to be under way before the end of the year, with gradual expansion of the Louisville production thereafter.

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INTERMEDIATE & RUBBER CHEMICALS DEPARTMENT

BOUND BROOK, NEW JERSEY, U. S. A.

SALES REPRESENTATIVES AND WAREHOUSE STOCKS- Akron Chemical Company, Akron, Ohio • Ernest Jacoby and Company, Boston, Mass. Herron & Meyer of Chicago, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • St. Lawrence Chemical Company, Ltd., Montreal and Toronto

bathing suit courtesy of Rose Marie Reid

Buys into Ohio Rubber Co.

The Eagle-Picher Co., 1100 American Bldg., Cincinnati 1, O., last month purchased 245,580 shares, or 98.2%, of the common stock of The Ohio Rubber Co. for $7,981,350. The shares were deposited in acceptance of Eagle-Picher's offer to purchase all the 250,000 shares outstanding at $32.50 per share, which expired at noon July 14. Ohio Rubber also has $1,837,500 of funded debt and $1,915,900 of preferred stock which remain outstanding.

The rubber company, whose origin dates back to 1873, manufactures mechanical rubber goods and produces a wide variety of molded and extruded rubber products sold principally to the automotive, farm equipment, and toy industries. In addition, the company is presently engaged in making tank tracks in substantial volume for the defense effort. Its plants are at Willoughby, O.; Conneautville, Pa.; and Long Beach, Calif.

Net sales of Ohio Rubber for the fiscal year ended September 30, 1951, were $32,740,000, compared with $22,819,000 for the preceding fiscal year. Net income before taxes amounted to $5,465,000 in 1951 and to $3,641,000 in 1950; net income after taxes was $1,824,000 and $2,184,000, respectively. Unaudited statements for the eight months ended May 31, 1952, show net sales of $19,454,000 and net income after taxes of $781,000. Operations from October 23, 1951, through February 26, 1952, were hampered by a strike in the company's plants at Willoughby and Conneautville; a related strike affected the California plant for a shorter period.

Ohio Rubber has experienced a substantial growth in recent years, sales having risen from $7,513,000 in 1940 to $32,740,000 in 1951. In the current year, sales might approximate those of 1951, despite the loss of volume resulting from the earlier strike in its own plants and the effect of the present steel strike upon its customers.

The rubber company will continue to operate under its present management headed by Franklin G. Smith, chairman, and H. F. Safford, president.

Elect New Officers

The directors of United Engineering & Foundry Co., Pittsburgh, Pa., at their regular quarterly meeting, July 22, declared a dividend of 25¢ a share on the common stock, which is equal to the 75¢ paid previously on the old stock before the recent split-up of three for one. The regular dividend of 1¾% was also declared on the preferred stock, payable at the same time as the common dividend, on August 12, to stockholders of record August 1.

The board elected K. C. Gardner, Sr., as chairman and chief executive officer of the company to fill the vacancy created by the death of F. C. Biggert, Jr. Mr. Gardner has been active in the company since 1899.

Geoffrey G. Beard, formerly executive vice president, was elected president and general manager.

K. C. Gardner, Jr., becomes executive vice president and will continue in direct charge of plant operations along with the general executive duties of his new office.

Maurice P. Sieger has been made vice president and senior engineer and has been delegated all the engineering and research activities which the late Mr. Biggert performed prior to his death on February 10.

G-E Appointments

George M. Yesse has been appointed manager of facilities engineering for the chemical division of General Electric Co. at Pittsfield, Mass. Mr. Yesse was employed by E. I. du Pont de Nemours & Co., Inc., for 13 years as an industrial engineer and as a process design engineer. In 1949 he became a project engineer in the development department of Weyerhaeuser Timber Co.

Donald A. Hilliard has been appointed supervisor of quality control for the chemical division alkyd resin plant at Schenectady, N. Y. Mr. Hilliard has had extensive experience in the paint and protective coating industry, four years in production management, and eleven years in laboratory management.

Robert H. Krieble has been appointed manager of engineering for the chemical materials department. After completing his studies in 1939, he took a position with the Socony Vacuum Oil Co., developing a new process for the manufacture of phenol. He joined the G-E research laboratory in Schenectady in 1943 and in 1946 was sent to Europe to study the German methods of producing certain plastics intermediates. When he returned he was appointed liaison representative of the research laboratory. In 1949, Dr. Krieble was transferred to the Thomson laboratory in the company's Lynn River Works where he served successively as head of the chemistry and insulation section, assistant engineer-technical, and as engineer of the laboratory.

New Silicone Marketing Plan

The chemical division has announced a new marketing approach on G-E silicone rubber designed to acquaint fabricators with the techniques and formulations necessary to produce molding and extrusion compounds from raw gums on their own equipment. According to C. E. Reed, general manager of G-E's silicone operations, the new approach enables fabricators to handle silicone rubber in the same manner as other elastomers, give faster service to customers, and gain greater flexibility of operation. To expedite this program G-E is making available a new silicone gum, together with detailed suggestions for converting the polymer to finished compounds. The new gum, SE-76, offers easy processing, excellent high and low temperature characteristics, and better all-around physical properties than former products, Dr. Reed said. G-E will continue to offer a line of silicone rubber compounds to those fabricators who may prefer to work with premixed materials.

Goddeyne Mfg. Co., Bay City, Mich., has purchased the Kayel Wheel Division of Kayel Machine & Tool Co., Detroit, Mich., maker of a well-established line of rubber tired, pressed steel wheels for the farm equipment and materials handling industries. A subsidiary company, Goddeyne Wheel Products, has been set up to absorb the manufacturing operation of Kayel Wheel and will be headquartered at the main Goddeyne plant. Company President Leo D. Goddeyne states that the distribution of Goddeyne wheels will be expanded through the use of intensive sales and advertising activities. Additional sales representation and distribution will also be sought in many leading industrial areas.

New Firestone Products

A new heavy-duty truck tire to meet the popular-price market has been announced by the Firestone Tire & Rubber Co., Akron, O. Of rayon construction with a tough rubber compound in the tread, the tire has a heavy, strong bead that is said to insure maximum stability through a better fit on the rim. According to H. D. Tompkins, vice president in charge of sales, the new Firestone Champion heavy-duty truck tire offers longer original mileage and retread mileage because its gum dipped, tension dried rayon cord "eliminates tire body growth and tread cracking." The tire's flatter tread and other design and construction features assure truck owners and operators of greater safety, extra mileage, and lower cost-per-mile operation, Tompkins said.

The development of a new synthetic rubber that eliminates the need of the costly refrigeration equipment now used to produce cold rubber for tire treads was announced by Raymond C. Firestone, vice president in charge of research and development. The new rubber is said to possess all the long-wearing properties of cold rubber, but is produced with the same equipment standardized in all synthetic rubber plants for making regular GR-S. Produced at the standard 122° F. polymerization temperature, the new rubber is based on the use of Nitrazole OF as the polymerization catalyst. Chemically, the catalyst is p-nitrobenzene diazonium p-chlorobenzene sulfonate. Tire tests conducted by government and Firestone test fleets, and comprising more than 2,000,000 tire miles, are said to have shown that Nitrazole rubber is equal to cold rubber in all respects.

Increasing Sales Staff

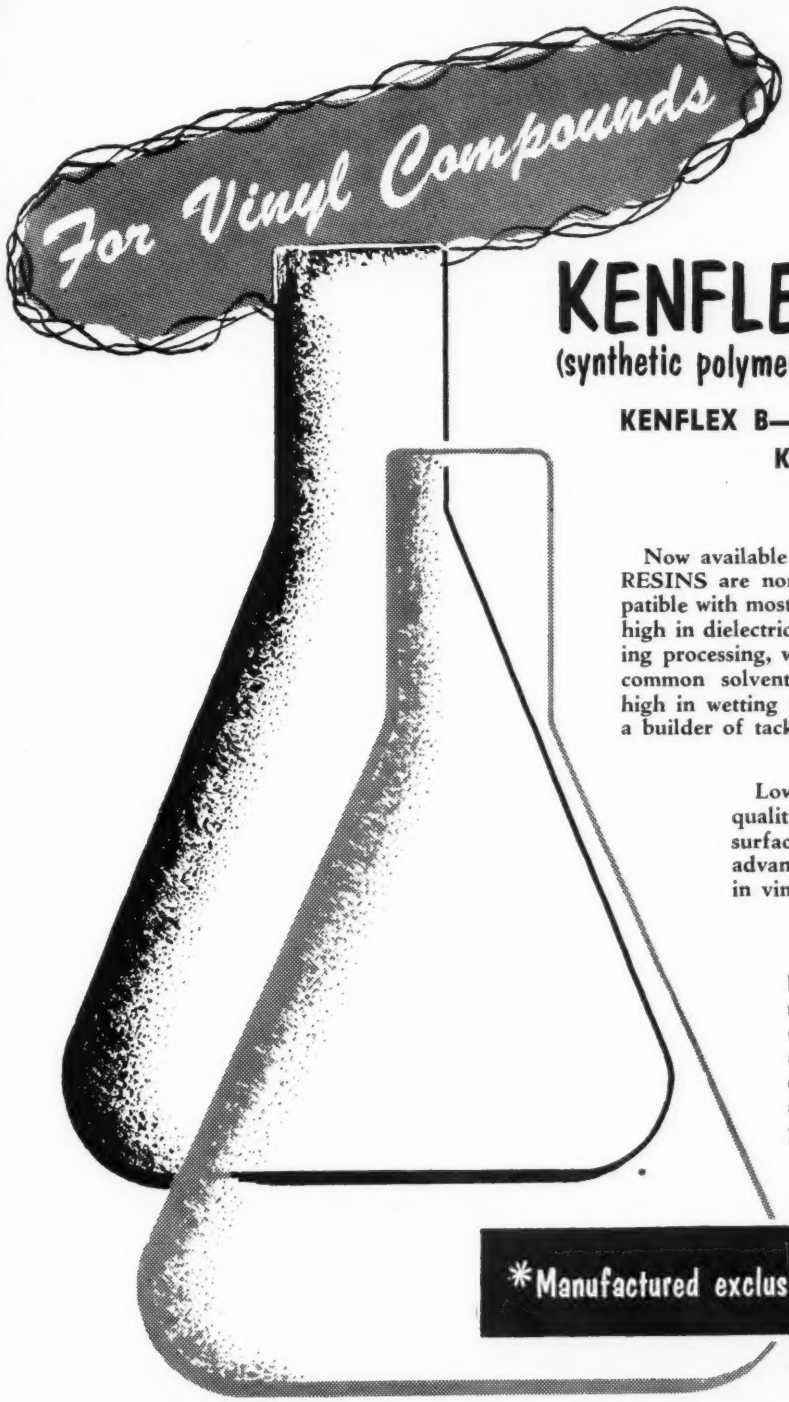
P. C. Cramer and T. C. Culver have been named in appointments enlarging the field sales staff of Hycar American rubber and rubber chemicals, according to W. D. Parrish, sales manager, B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O. In addition, Frank E. Bell, Jr., will reenter field sales by handling special Hycar sales assignments, and G. A. Daum will handle Hycar sales in the Cleveland and the Pittsburgh areas.

Cramer will now service the immediate Philadelphia area, as well as Delaware, Virginia, and eastern West Virginia. He joined the B. F. Goodrich Co. in 1943 as a chemist, transferred to Goodrich Chemical in 1946, and became a Hycar technical service engineer in 1948.

Culver started with Goodrich in 1940 as a chemist, became a technical service engineer for Goodrich Chemical in 1947 and a sales representative in 1949. He will now be responsible for Hycar rubber sales in the southeastern states. Culver will maintain his permanent headquarters in Clemson, S. C.

Bell will cover part of the area formerly serviced by Culver, eastern Indiana and Michigan, Ohio, and western New York, and Pennsylvania. Bell began with Goodrich Chemical in 1944 as a senior technical service engineer and has been with the Hycar sales group since that time.

Hycar sales in the immediate Cleveland and Pittsburgh areas will now be handled by G. A. Daum, technical service engineer. He has been with Goodrich Chemical since 1945 and has filled various technical positions.



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Reid Succeeds Roberts

J. L. Reid has been appointed district manager of mechanical goods sales at Salt Lake City, replacing W. T. Roberts, who retired July 1 after 32 years with Goodyear Tire & Rubber Co., Akron, O.

Mr. Reed joined the company's aircraft division in Arizona in 1942. He entered the sales field as a mechanical goods trainee in 1949 and was a field representative at Phoenix, Ariz., until 1951, when he was transferred to the Salt Lake City district in the same capacity.

Roberts was with the mechanical goods division in the Northwest from the time he joined the firm as a trainee in 1920. In Denver, Colo., he worked as a plant analyst and was later in mechanical goods sales at Salt Lake City, Butte, Mont., and Seattle, Wash.

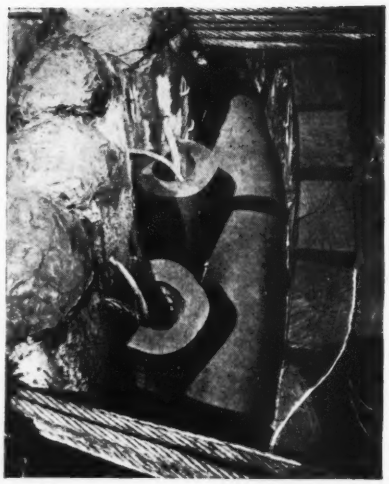
Goodyear Developments

Pliolite Latex 160, an entirely new synthetic rubber latex, is now being produced by Goodyear in commercial quantities for use in latex emulsion paints. The new latex is expected to take its place beside the company's Pliolite S-5 as a leader in styrene-butadiene copolymers for paints. Pliolite Latex 160 is far superior to any other paint latex Goodyear has produced to date, according to R. E. Workman, in charge of commercial development for the company's chemical division. This superiority is manifested in finished paints by better scrub resistance, higher film hardness, less odor, excellent film clarity, alkyd compatibility, better particle size and distribution, improved mechanical stability, and good brushing and application characteristics.

A specially designed neoprene impregnated nylon sphere made by Goodyear will be used by the Army Signal Corps to determine temperatures 55-70 miles above the earth. The 4½-foot sphere, looking like a partially deflated balloon, will be carried aloft in an Aerobee rocket. Near the peak of the rocket flight, the sphere will be released after being completely inflated by a pressurized cylinder. Enclosed in the sphere will be an electronic transmitter sending continuous signals to a ground station. Temperatures in the upper air atmosphere can be determined by measuring the rate of fall of the sphere.

A rapid expansion has taken place in uses of Goodyear's Neolite as a raw material for shoe uppers, innersoles, luggage, accessories, and novelties. More than 20 different products are now being made from Neolite, which is waterproof, may be finished in any color, will not crack or dry out, and has long wearing qualities.

To protect both the ship and the pier and aid in docking the superliner *United States*, a new type of marine fender was constructed on Pier 86, North River, New York, N. Y. Designed and built by the George W. Rogers Construction Co. in cooperation with Goodyear, the fender is expected to absorb the impact of the ship and prevent damage to either her hull or the pier. As shown in the accompanying illustration, the fender consists of two concentric arcs of piles sunk deep in the river bottom, with the space between the arcs taken up by special rubber cylindrical dock fenders. The entire assembly provides a high degree of resiliency and 27 inches of compression space to absorb shock. Ten vertical rubber tubes, each 12 inches in outer diameter, hang along the inner arc of piles. Outside these are superimposed four 26-foot long rubber cylinders, each 15 inches in diameter. Four horizontal wooden wales are fastened to the inside of the outer piling arc and are covered with vertical oak sheeting that makes contact with the horizontal rubber cylinders when pressure is exerted on the outer piles.



Pier Fender for Docking the S.S. *United States* Has Two Arcs of Wooden Piles Separated by Vertical and Horizontal Rubber Tubes

The transportation of an 1,814-foot conveyor belt, believed to be the longest conveyor belt ever shipped in one continuous piece, presented Goodyear's shipping department with an unusual problem. The 30-inch wide, seven-ply belt made a roll almost 12 feet in diameter and had to be transported from the mechanical goods plant in Akron to the customer in Indiana. The haul was made on a special truck after bridge and underpass clearance permits were obtained from the states of Ohio and Indiana to transport the belt on the highways. Doors on Goodyear's shipping dock had to be removed to get the belt roll out of the plant.

The American rubber industry is called upon to produce more than 1,000 different sizes and types of tires involved directly or indirectly in our national economy, according to R. P. Dinsmore, Goodyear vice president in charge of research and development. Speaking as a guest lecturer at a clinic on elastic high polymers at Massachusetts Institute of Technology, Dr. Dinsmore discussed steering control, cushioning ability, durability, safety, and other factors involved in tire construction.

U.S. Advances Several

United States Rubber Co., Rockefeller Center, New York 20, N. Y., has appointed Fred A. Sawyer assistant development manager of the footwear and general products division.

Edmund G. Nagle succeeds Sawyer as manager of automotive sales for the division's products. Although the appointments were effective July 1, Sawyer will spend most of his time up to September working with Nagle on automotive sales assignments in Detroit. Later Mr. Sawyer will make his headquarters in the company's Mishawaka, Ind., plant, assisting George Blair, development manager of the division.

Mr. Sawyer started with the rubber company in May, 1939, as a sales engineer, contacting automotive customers. Later responsibilities included extensive engineering and sales work with fuel cells, foam rubber, auto mats, and other automotive products. Early in 1946, he was appointed manager of development sales of the footwear division and in July, 1947, he became manager of the company's new plant in Chicago, where fuel cells, Royalite, and other plastics are manufactured. He pioneered in the sale and promotion of Royalite parts for automotive use. In October, 1949, Sawyer was made manager of automotive sales, with headquarters in Detroit.

Mr. Nagle will be responsible for all products of the division sold to automobile manufactures and allied customers in the Detroit area, including foam cushioning, automobile mats, Naugahyde coated fabrics, fuel cells, sponge rubber products, Royalite, and other plastic parts.

Mr. Nagle joined U. S. Rubber more than 13 years ago as a clerk in the Mishawaka plant. After various promotions, he was appointed assistant sales manager of Koylon foam for automotive use. Two years later he became sales manager of the automotive foam and mat department.

In an organization change announced July 21 by Lawler Reeves, sales manager, U. S. tires division, C. H. Schlicter, formerly market identification manager, was appointed manager, U. S. passenger tube sales. Schlicter began with U. S. Rubber as an assistant in the advertising department in May, 1935, and in August, 1943, entered military service. He returned to the advertising department in November, 1945, and was transferred in December to Los Angeles as field representative of the department. In May, 1948, he was put in charge of special projects and field promotion and in September, 1950, was named market identification manager.

Succeeding him in that capacity is A. L. Broggi, with the company in charge of distributor premises and layouts since 1944.

T. E. Berry has been upgraded to assistant divisional manager on the West Coast. Berry started with the company in October, 1932, as a tire salesman in Los Angeles, where he was appointed assistant district manager in January, 1934. A year and a half later he was transferred to Dallas as district manager; in January, 1940, was moved on to the San Francisco office as assistant district manager; in May, 1940, he was appointed district manager, U. S. Royal tires, at San Francisco and was named general office representative for the Pacific Coast in September, 1950.

W. B. Swartz has been transferred from St. Louis to Milwaukee as district manager, succeeding R. B. Redick, who has taken on a U. S. Royal distributorship franchise. Swartz started with U. S. Rubber in Newark, N. J., as a salesman in 1946. Transferred to Boston in 1949, he became assistant manager of truck tire sales later that year and in 1950 gained the St. Louis district post.

Swartz is replaced at St. Louis by F. C. Tucker, former district manager at San Antonio and Memphis, who was recently released from Ordnance Department of the U. S. Army after a year's recall to service. He began his career with the rubber company in 1939.

U. S. Rubber has appointed Rubber Fabrics Co., of New York, N. Y., distributor of its cast vinyl film laminated to knitted fabric, being produced in the recently purchased Stoughton, Wis., plant. Rubber Fabrics will market the material under the trade name Vinonit and will be responsible

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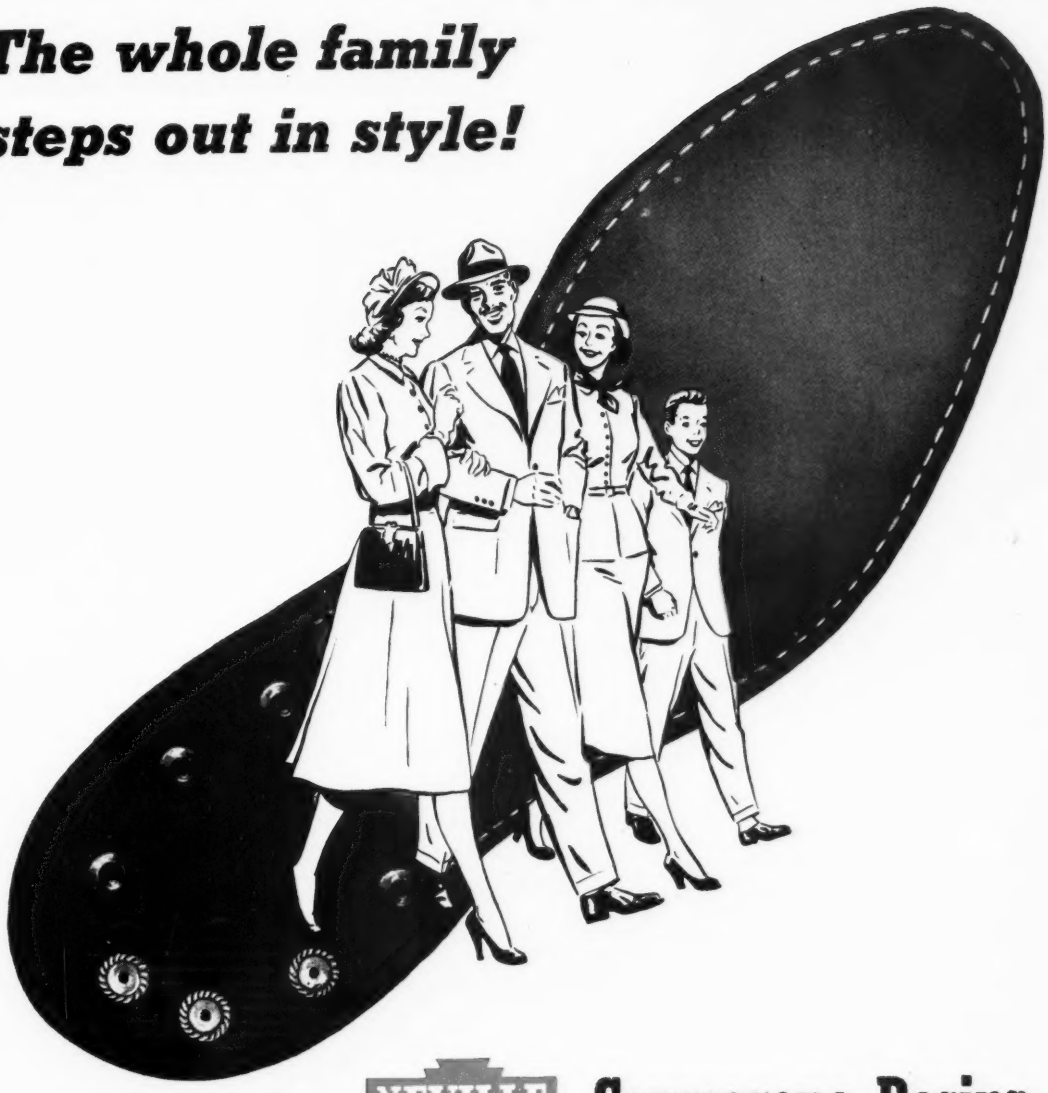

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for its sales to the infants wear trade of New York, New Jersey, New England, and Pennsylvania. The company will also be in charge of national sales of Vinonit to the household and work glove trade.

Product Developments

Scientists in U. S. Rubber's mechanical goods division development department at Passaic, N. J., have completed construction of hot and cold "torture" chambers to test rubber and plastic aircraft parts at temperatures up to 600° F. and down to −80° F. in their search for better materials to withstand extremes of temperatures. Inside the chambers are electrically driven devices which bend, stretch, or otherwise punish the products while at extreme heat or cold. The heavily insulated cold chamber is refrigerated by means of dry ice immersed in alcohol, with the temperature thermostatically controlled. The hot chamber, an electrically heated oven of the circulating air type, is equipped with air temperature, pressure, and flow regulators and measuring devices.

Products passing the tests are guaranteed to weather the North Pole, the stratosphere, the Sahara Desert, or any other spot, and are also designed to resist the heat generated by airplane motors and exhausts. Both rubber and plastics are coming into greater use in aircraft because of the progress being made in eliminating failures owing to heat and cold. The problem of brittleness which formerly caused rubber parts to shatter when flexed in the Arctic has been virtually solved, and the usefulness of synthetic rubbers has been extended in high-temperature applications.

An important development is the replacement of metal by plastic and rubber air ducts in aircraft heating and ventilating systems. The new ducts are lighter, easier to install, more resistant to fatigue failure, and made in many shapes and sizes, in both rigid and flexible forms. The new ducts are usually reinforced with glass fiber and coated with thermosetting resins, silicones, or neoprene, depending on the properties desired for a given application.

U. S. Rubber is introducing a new type of practice golf ball so sensitive to the way it is hit that it will indicate to the golfer a hook, slice, or other faulty swing which can be corrected by practice. A molded, dimpled ball that resembles a real golf ball in size, color, and appearance, the new product is made of Ensolite, an expanded cellular plastic containing thousands of nonconnecting gas cells. Since 90% of its volume is gas, the practice ball weighs only 1/13 as much as a regular golf ball. Because of its light weight and soft feel, the Ensolite ball can be used safely indoors without harm to furniture or windows. Outdoors, it is easy to retrieve since good drives average only a little more than 100 feet in flight. The ball will not pick up water in the rain or on wet ground to change its flight characteristics. The new ball is durable and retains its shape; tests have given the equivalent of 2,500 hard drives without failure.

U. S. Rubber has announced that it is in volume production of synthetic crepe rubber soles and heels that are durable and light in weight. Called U. S. Royal Cel-O-Crepe, they are being sold in sole and heel combinations to manufacturers of men's, women's, and children's shoes. The crepe is also being sold in 36-inch square sheets to shoe manufacturers who do their own cutting of outsoles. Cel-O-Crepe is currently available in white, natural, red, chocolate, and black colors. It is made in a strippled design with a crepe-like appearance, as well as in a smooth design with a sanded, velvet surface. Both types are being produced in a variety of thicknesses to meet shoe requirements.

Tingley Rubber Changes

At a special stockholders' meeting of Tingley-Reliance Rubber Corp., Rahway, N. J., July 17, the name of the company was changed to Tingley Rubber Corp.

At the same time William H. Rand, treasurer, was made president; while William McCollum, Sr., moved from president to chairman of the board.

Tingley, founded in 1896, makes rubber footwear and automotive accessories as well as molded rubber products for the electrical, optical, appliance, and other fields.

Natural Rubber Bureau, 1631 K St., N. W., Washington 6, D. C., has arranged for the filming of a short subject, "Rubber Roads," by United World Films, Inc. Richard Rosen was signed to direct the film, which went into production July 9 and will be shot in Washington, D. C., Baltimore, Md., and the Universal-International Studios in Hollywood, Calif.

WEST

Dow Appointments

Frank B. Smith, recently returned from Washington, D. C., has joined Dow Chemical International, Ltd., and Dow Chemical Inter-American. For the past six months Dr. Smith was on loan to the government as technical consultant for the Chemicals Branch of the Rubber, Chemicals & Drugs Division, OPS. Previous to his service Smith had been associated with the technical service and development department of The Dow Chemical Co., Midland, Mich. In his new duties, he will handle special assignments and will be concerned with all phases of technical problems involving the overseas offices and customers of the two companies.

Denis J. Mullins, former office salesman in New York, has been named a plastics molding powders salesman for that area. Mr. Mullins came to Dow in 1949 after several years with American Cyanamid Co.

Bjorksten Research Laboratories, Chicago, Ill., has established an office in Washington, D. C., principally as a center for literature research in the libraries of the Patent Office, the Library of Congress, and other Washington depositories. This office is under the direction of James W. Perry, director of literature research at Bjorksten. Henry C. Tovey is attached to the Washington office as literature chemist. Mr. Perry is a past chairman of the American Chemical Society's Division of Chemical Literature and is now serving on various A. C. S. committees. He is also the author of several books.

Monsanto News

Monsanto Chemical Co., St. Louis, Mo., has made Charles W. Roberts manager of a newly created sales service department of the plastics division at Springfield. The new department will have direct supervision of Monsanto's order and sales correspondents department, sales statistical department, and branch office administration. Roberts, who had been serving since 1940 as manager of the sales correspondents and order department, will be succeeded in that position by Frank M. Hartwell.

Theodore S. Lawton Jr., has been named sales manager for the vuepak and sheet departments of the plastics division. He started with the company as a research chemist in 1939. In 1944 he became a member of the technical service department; in 1946, he joined the field sales department and in 1948 was appointed assistant sales manager.

Richard E. Stockwell has become editor of *Monsanto Magazine.* He has had several years' experience in trade journal, newspaper, and radio work.

Perfumed vinyl film and sheeting, developed and manufactured by Monsanto's chemical division at Springfield, Mass., were introduced by Plastron, Inc., New York, N. Y., at the Housewares Show in Atlantic City, N. J., on July 7. The flower perfume is said to be an integral part of the Ultron plastic and not a coating or something sprayed on the film.

According to Monsanto researcher Robert R. Lawrence, "Accelerated laboratory tests lead us to believe the perfumed plastics will provide fragrance to rooms for several months."

Plastron, which temporarily has exclusive rights to the development, displayed flower scented shower curtains and window curtains in molded textured Ultron in both translucent and opaque colors. Both types will also be available in yard goods, Plastron announced.

Polyethylene Film Plant

Durethene Corp., 1859 S. 55th Ave., Chicago 50, Ill., a producer of polyethylene film, is erecting a manufacturing plant on the outskirts of Los Angeles, Calif., in order better to serve its West Coast customers in the rubber industry, packaging trade and soft goods line, and other industrial users. The land area totals 35,000 square feet on which the plant is being built, to be ready for production about October 15.

Sales and customer service for the area west of the Rockies will be handled through the Los Angeles office, with John McSparran in charge of operations. Mr. McSparran has many years of experience in the rubber, chemical, and packaging fields.

Goodyear Synthetic Rubber Corp. recently installed an RCA metal detector in its Houston, Tex., plant for the manufacture of GR-S. The unit is set up between the baling and packaging operations and is used to detect any tramp metal in the rubber before being shipped. Approximately 170,000 pounds of GR-S are scanned by the metal detector each day and about 0.5% is rejected by the detector. The detector, manufactured by Radio Corp. of America, is marketed in the United States and Canada by Eriez Mfg. Co.

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CANADA

Rubber Consumption Down

Combined stocks of rubber—natural, synthetic, and reclaim—at the end of May increased to 11,918 long tons from 9,808 on the same date last year; while consumption was down to 7,072 tons from 8,316. Domestic production of synthetic and reclaim rose to 6,126 tons from 4,304.

Stocks of natural rubber on May 31 amounted to 3,524 tons, compared with 4,580 a year ago; synthetic, 6,814 tons, against 3,051; and reclaim 1,580 tons, against 2,177.

Consumption of natural rubber totaled 2,726 tons, against 4,538 in May last year; synthetic, 3,139 tons, against 2,140; and reclaim 1,207 tons, against 1,638.

Domestic production of synthetic rubber aggregated 5,625 tons, compared with 3,779, in May, 1950, and reclaim 501 tons, against 525.

Polymer Corp. Growing

Polymer Corp., Sarnia, Ont., will start on a $1,250,000 construction program in which the chief project will be a new petrochemicals research laboratory.

The program will also include installation of a sixth boiler, a new Girbotol unit for purification of light hydrocarbons, and facilities further to diversify operations in the copolymer units.

The company has spent $10,233,000 on a current expansion program designed to boost overall capacity by 25% and add a further measure of product diversification. During the past fiscal year (ended March 31) a record total of 34,300,000 pounds of butyl rubber and 114,400,000 pounds of butadiene-type rubbers were produced.

Record sales and earnings were reported by Polymer for the past fiscal year. Gross income was $45,895,000; net profit was $8,375,786, and working capital was $12,384,398. Capital invested in the plant at the end of the fiscal year was $66,285,000, and the company had 2,307 employes on that date. In his report to Defense Production Minister Howe, J. D. Barrington, Polymer president and managing director, pointed out that the company's net profit would have been reduced to approximately $3,950,000, last year had it been subject to income taxes. Polymer's structure has now been rearranged, and the plant and assets transferred from the Crown to the company. This new arrangement now involves the company paying federal income taxes.

Polymer is now meeting the entire Canadian requirement for synthetic rubber, which is about one-half of all new rubber consumed, Mr. Barrington said. The general sales outlook should be viewed with restraint, since a further drop in the price of natural rubber or the issuance of more stringent currency restrictions could result in difficulty in maintaining previous sales tonnages to Europe. Increasing competition can also be expected from the United States and Germany. Although the world rubber supply situation may create fluctuations in demand, Polymer expects to maintain a high level of production, Mr. Barrington declared. It is highly probable, however, that the company's most profitable ventures in years to come will be in the development of specialized products for uses not directly competitive with natural rubber or affected by volatile market condition.

NEWS ABOUT PEOPLE

R. K. Goodhue

R. K. Goodhue has been named Akron district sales manager for Stauffer Chemical Co., New York, N. Y., with which he has been associated since 1942.

John J. Nagle, chairman of the board and president of Crown Cork & Seal Co., Inc., Baltimore, Md., has announced that Richard P. Swartz, president of Crown Can Co., a wholly owned subsidiary, has resigned as president and also as a director and member of the executive committee and as a director of Crown Cork and Seal. Mr. Nagle has been elected president of Crown Can in addition to his office of chairman of the board of that company.

John G. Harrison has been named director of research and development at the Atlantic Tubing & Rubber Co., Cranston, R. I., and will head research in all divisions and departments. His business experience was gained with the Firestone Tire & Rubber Co., in the development of tires, tubes, and mechanicals; Vulcan Proofing Co., in the coated fabrics field; and the Trenton division of National Automotive Fibres, Inc.

John G. Harrison

John A Riley has been elected secretary-treasurer of The Timken Roller Bearing Co. Canton, O., to succeed the late R. C. Brower. Responsible for the establishment of one of the finest accounting systems in the country, Mr. Riley came with Timken in 1925 after 18 years in the banking and public accounting business. Riley also initiated, at the Timken company, one of the most comprehensive and intensive executive training programs in industry. He still teaches several classes of young men the fine art of accountancy each week. Riley's record with Timken has been one of steady progress. Starting with the company as comptroller, in charge of all accounting, he was soon ahvanced to assistant secretary and assistant treasurer, which post he held unti' his new appointment.

Karl M. Fox has joined the staff of Miller-Warden Associates, asphalt consultant, Swarthmore, Pa., to take charge of plastics and rubber interests. Fox had been associated with Goodyear Tire and Rubber Co., Dewey & Almy Chemical Co., MIT, and Rohm & Haas Co.

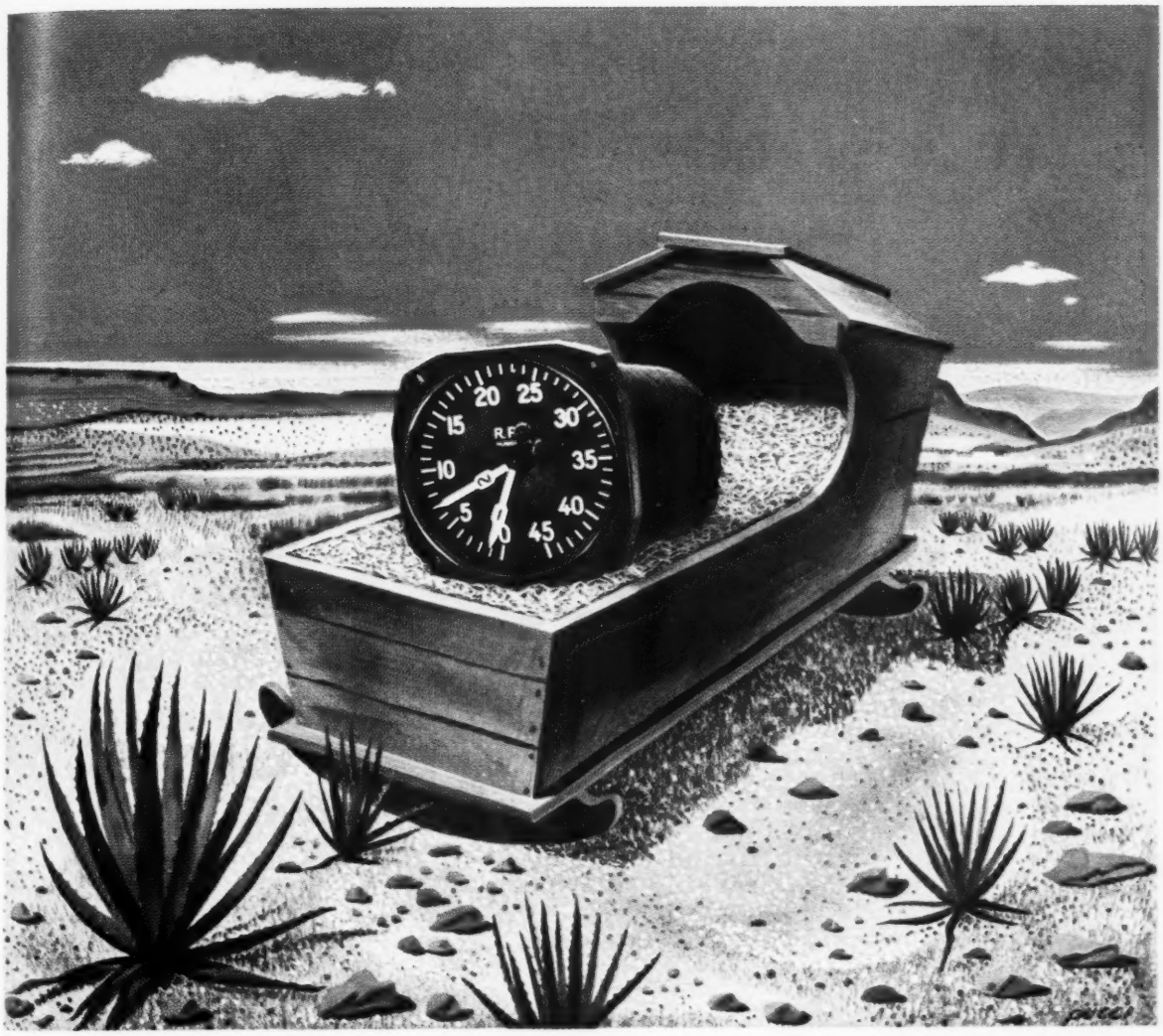
Ernest Nathan has resigned as vice president of Sun Chemical Corp., Long Island City, N. Y., and also as chairman of the chemicals group comprising the Warwick Wax subsidiary and Warwick Chemical Division.

J. K. Buckwalter, since 1948 direct sales manager of The Wooster Rubber Co. Wooster, O., on July 22 was named general sales manager to succeed J. R. S. Conybeare, resigned. Mr. Buckwalter will be in charge of Rubbermaid houseware and Rubbermaid Kar-Rug sales in the United States and Canada. Since he joined the organization, Mr. Buckwalter has been in charge of sales to specialty, chain, mail-order, and export companies. He entered the Wooster company following sales and industrial engineering experience with the U. S. Asbestos Division of Raybestos-Manhattan, Inc.

F. L. Burnett, treasurer-assistant secretary, Pioneer Rubber Mills, San Francisco, Calif., has been elected to membership in the Controllers Institute, 1 E. 42nd St., New York 17, N. Y.

Allison L. Bayles has established an office at 713 St. James St., Pittsburgh 32, Pa., to practice consulting engineering in the fields of product investigation, product development, plant layout, and fine particle techniques.

Elmer French, vice president of Firestone Plastics Co., Pottstown, Pa., recently returned from a visit to Firestone plants and plastics customers in England and on the Continent. In commenting on the use of plastics abroad, Mr. French stated that he found the European products considerably less advanced than the American in both styling and extent of application. Great interest in new developments was in evidence, and an expansion in European plastics markets may be expected as the dollar situation eases.



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Yes, now they've even got that Mexican desert weed—cactus—working! And at a delicate, shock-insulating job—protecting some of our nation's most precious cargo!

Made into a wonderful cushioning material, it's cradling shipments of delicate flight instruments, expensive recording and laboratory equipment—many of the most prized packages of such well-known companies as General Electric and Allen B. Du Mont Laboratories, Inc.

The secret? Naugatuck Lotol.® This latex compound coats and bonds cactus fibers firmly and lastingly together to make a light, airy cushioning pad called Tulatex*. So resilient, it gives real space savings—so light, it means a big cut in shipping weight!

If you're a manufacturer, think of what Lotol can mean to *you*—specially compounded to answer *your specific needs* in bonding, coating, dipping, sizing, or saturating.

Whatever your product, there's a good chance you can be helped by Naugatuck Chemical's fine basic materials and long experience in improving old products, helping to create new ones. Why not look into it today by writing to the address below.

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MARVINOL® vinyl resins • KRALASTIC® styrene copolymers • VIBRIN® polyester resins

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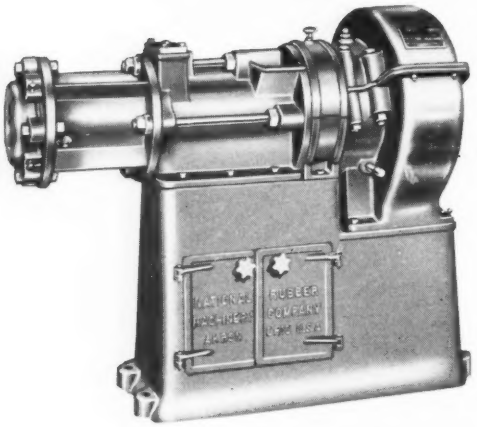
NRM MIL-X-TRUDER

MIXES AS IT EXTRUDES
ELIMINATES "WARM-UP" MILLING



NRM's 3½" Steam Heated MIL-X-TRUDER and a diagrammatic sketch of its internal recirculation of stock.

The MIL-X-TRUDER is an exclusive NRM development. It combines intensive mixing with precision extrusion. A specially designed feed screw and fluted cylinder create an internal recirculation of the compound being extruded. The shearing and working that occur insure thorough mixing and plastication.

The advantages of the MIL-X-TRUDER have been fully proved in production. Replacing a conventional machine, the MIL-X-TRUDER takes room temperature stock, eliminates "warm-up" milling. It provides an even feed and smooth extrusions. Its thorough mixing permits the reprocessing of scrap without trouble. The dies you are now using on a standard machine can be used on a MIL-X-TRUDER.

Let NRM's engineeers show you how to save time, space, and equipment with a MIL-X-TRUDER. Write, today!

NRM Newsnotes

NRM BUILDS NEW EASTERN OFFICE

Construction is underway on a new, modern building to house the administrative and engineering personnel of NRM's Clifton plant. It will also serve as headquarters for the Eastern sales division. The new building will be located at 384 Getty Ave., Clifton, N. J. It should be ready for occupancy about September 1, 1952.

NEW BOOKLET DESCRIBES MAKING OF FEED SCREWS

"19 STEPS TO BETTER EXTRUDING AND STRAINING" is a new 16-page booklet that graphically describes the design and manufacture of high quality extruder and strainer feed screws. Just off the press, it will provide interesting and worthwhile reading. Write for your copy, today! It's yours for the asking.

"SPEC" SHEET ON NEW 2½" EXTRUDER NOW AVAILABLE

NRM's new 2½" Heavy Duty Model 50 Rubber Extruder is fully described in a recently printed specifications sheet. The complete information offered includes a description of parts, dimensional drawings, sketches, capacities, etc. Learn how this new unit can give you years of accurate, trouble-free rubber extrusions. Get your copy, today!

2056

NATIONAL RUBBER MACHINERY COMPANY

NRM

Creative Engineering

General Offices & Engineering Laboratories: Akron 8, Ohio
East: 384 Getty Ave., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Cal.
Export: Gillespie & Company, 96 Wall Street, New York 5, New York

OBITUARY

Lammot du Pont

LAMMOT DU PONT, president of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., for 14 years and youngest of the three brothers who led the Twentieth Century development of the 150-year-old chemical company, died in a New London, Conn., hospital, July 24, after a month-old heart ailment.

Lammot du Pont was born October 12, 1880, near Wilmington. He was graduated from Massachusetts Institute of Technology in 1901, worked for a short time as a draftsman with the Pencoyd Iron Works, and a year later went to work at the du Pont plant, founded by his great grandfather, Eleuthere Irenee du Pont de Nemours, in 1802. He became general superintendent in the black powder department in 1913, a director and member of the executive committee in 1915, a vice president, and president in 1926, after Irenee du Pont's resignation. A term as head of the company's miscellaneous manufacturing activities schooled him in the company's expanding interests in plastics, paints, dyes, and other chemicals so that he was well prepared to become the chief at that time, thus making him the eighth member of his family to head the firm and the third successive brother to hold the office of president. He was elected chairman of the board in 1940 and held that position until his retirement in 1948.

During the depression of the 1930's when the expenditures for the operation of the du Pont research laboratories were increased almost sevenfold, Lammot du Pont still led the company forward with results being such outstanding developments as man-made rubber compounded from coal, limestone, and salt; the synthesis of nylon; and other research achievements that, in recent years, were accounting for more than 40% of the du Pont business.

Besides his many duties with the company that bears his family's name, the deceased was also a director of General Motors from 1918 until 1946, chairman of its board of directors from 1929 to 1937, and for a time, a member of its finance and policy committees.

He was past president of the Manufacturing Chemists' Association, a member of the National Association of Manufacturers, the Chamber of Commerce of the United States, and other national bodies representing industry, and a director of the Wilmington Trust Co. He also belonged to the Republican party.

Mr. du Pont is survived by his fourth wife, five sons, and five daughters.

The body was sent from New London to Wilmington where private funeral services were held July 28. Interment was at the family cemetery near the site of the company's first powder mill on Brandywine Creek.

R. M. Graham

R. M. Graham, director of purchasing, The General Tire & Rubber Co., Akron, O., suffered a fatal heart attack at his office, July 9.

He was born in Sidney, O., 61 years ago. Mr. Graham received a degree in chemistry from Miami University in 1913, and began his career in the rubber industry immediately after.

In 1928 he joined General Tire as a development engineer, a year later was placed in charge of industrial engineering, and in 1932 was transferred to the purchasing department.

During the first World War the deceased was a captain in the Chemical Warfare branch of the Army, and both during and after World War II served as a rubber buying agent for General Services Administration.

A member of the National Purchasing Agents Association, Mr. Graham was past president of the Akron chapter, a Mason, and a member of the American Legion and the University Club.

Survivors include the widow, two daughters, a brother, and a sister.

Funeral services took place July 12 at Westminster Presbyterian Church, where he had been a member, followed by burial in Rose Hill Cemetery.

R. C. Brower

R. C. BROWER, 60, secretary-treasurer and a director of The Timken Roller Bearing Co., Canton 6, O., died July 13 at his summer home in Melvin Village, N. H.

Mr. Brower started in the bearing business in 1916 as sales manager for Bearing Service Co. He joined Timken as assistant general manager of the service sales division, January 1, 1923, and progressed to general manager of the division, assistant secretary and treasurer of the company, secretary-treasurer (April 4, 1930), and a member of the board of directors (January 11, 1936).

The deceased was a Mason, a member of the Scottish Rite, Stark Consistory, the William McKinley Lodge, York Rite of Canton, O., and the Al Koran Shrine of Cleveland.

He leaves his wife, a daughter, and a son.

Funeral services were held July 16 in Canton.

George M. Jenkins

GEORGE M. JENKINS, manager of truck tire sales of The Firestone Tire & Rubber Co., Akron, O., died June 29.

Born in New Albany, Ind., April 9, 1896, the deceased attended both grade and high schools there.

Jenkins first started with Firestone in 1925 as an instructor in the service school in Akron. He successively held positions as service manager in Kansas City and Chicago, general-line salesman, assistant district manager, store manager and store supervisor in Chicago. From 1936 to 1937 he was store supervisor in Minneapolis, and from 1937 to 1942 district manager in Milwaukee. In 1942 he was made manager of off-the-highway tire sales in Akron, until February 20, 1947, when he was promoted to manager of truck tire sales.

A veteran of World War I, George Jenkins was a member of the American Legion and Masonic bodies.

Funeral services were held July 2 at the Billow Chapel, Akron, followed by interment the next day in Louisville, Ky.

His wife survives.

William J. McCauley

WILLIAM J. McCAULEY, president and a director of H. Muehlstein & Co., Inc., 60 E. 42nd St., New York, N. Y., died July 22 in a New York hospital after a three weeks' illness. He was 54.

A native New Yorker, the deceased joined the Muehlstein company in 1917 and shortly afterward was appointed manager of the crude rubber division. He was elected a director in 1922, secretary in 1931, vice president in 1942, and president in 1944. Besides holding these various posts in the New York company, he was also a director of H. Muehlstein & Co., Ltd., London, and a director and treasurer of a company by the same name in Canada.

During World War II, Mr. McCauley received a two-year leave of absense from Muehlstein to serve as administrative assistant in charge of scrap rubber for the Rubber Reserve division of the Reconstruction Finance Corp. At the end of the war he was named a director of the Rubber Distribution Corp., a federal agency responsible for the distribution and liquidation of surplus crude rubber stocks then owned by the Government.

Mr. McCauley was a director of the National Association of Waste Material Dealers, past president of the Scrap Rubber Institute, and a member of the Seawane Harbor Club, of Hewlett, L. I., and the New York Athletic Club. He lived in Belle Harbor, L. I.

Requiem Mass was sung July 25 at St. Francis De Sales church in Belle Harbor. Interment was in St. John's Cemetery.

Surviving are his wife, three sons, three daughters, two brothers, and a sister.

J. A. Shea

J. A. SHEA, 64, advertising staff representative of the Goodyear Tire & Rubber Co. of California, died June 26 at his home in Manhattan Beach, Calif., following a two months' heart illness.

The deceased attended Cornell and St. Lawrence universities in New York before joining Goodyear, California, in 1919, where his entire service was in advertising work until 1934, when he was transferred to the Akron plant to take charge of retail newspaper advertising. In 1936 he returned to California as senior advertising staffman.

Mr. Shea leaves his wife, two sons, and one daughter.

Services and burial were held in California.

Douglas S. Dilts

DOUGLAS S. DILTS, since 1933 president of H. N. Richards Co., Trenton, N. J., died June 11 in a Trenton hospital. Funeral services were held June 14 in Pennington Presbyterian Church, where he was an elder, with interment following in Pennington Cemetery.

Mr. Dilts was graduated from Cornell University in 1917. In 1930 he became associated with H. N. Richards Co.

A 33rd degree Mason, Douglas Dilts was also a member of the board of directors of the Trenton Chamber of Commerce, chairman of the camp and hospital committee at Fort Dix, president of the

Pennington Red Cross Chapter, a former chairman of Mercer County Selective Service Board 29, a past president of the Pennington Lions Club, and a member of the Trenton Kiwanis and the Cornell clubs of New York and Trenton.

He was born in Lambertville, N. J., 57 years ago.

Survivors include his wife and two daughters.

FINANCIAL

Allied Chemical & Die Corp., New York, N. Y. June half, 1952: net income, $20,633,771, equal to $2.33 a share, against $20,442,758, or $2.31 a share, in the 1951 half; sales, $244,326,336, against $254,691,881.

American Cyanamid Co., New York, N. Y., and wholly owned subsidiaries. First half, 1952: net earnings, $12,055,920, equal to $2.79 each on 4,242,076 common shares, contrasted with $22,755,179, or $5.28 each on 4,167,982 shares, a year earlier; net sales, $183,258,919, against $200,914,606.

American Hard Rubber Co., New York, N. Y. Twenty-four weeks to June 15, 1952: net earnings, $177,176, equal to 45¢ a share, contrasted with $582,577, or $1.94 a share, in the 1951 weeks.

American Zinc, Lead & Smelting Co., Columbus, O., and wholly owned subsidiaries. Year ended June 30, 1952: net profit, $3,397,654, equal to $4.54 a common share, compared with $4,087,553, or $5.57 a share, in the preceding fiscal year; sales and other income, $85,015,057, against $79,791,930.

Baldwin-Lima Hamilton Corp., Philadelphia, Pa. Initial half, 1952: net profit, $3,106,973, equal to 65¢ a common share, against $2,007,313, or 42¢ a share, in the 1951 months.

Borg-Warner Corp., Chicago, Ill. First half, 1952: net income, $10,867,457, equal to $4.51 a share, against $11,594,587, or $4.84 a share, in the like period last year; net sales $185,202,424 against $201,832,434.

Boston Woven Hose & Rubber Co., Cambridge, Mass. Nine months ended May 31, 1952: net income, $474,323, equal to $5.04 a common share, compared with $973,629, or $10.88 a share, a year earlier; sales, $15,945,019, against $19,400,479.

Brown Co., Berlin, N. H., and **Brown Corp.**, LaTuque, P.Q., Canada. Twenty-eight weeks to June 14, 1952: consolidated net income, $3,107,414, against $4,001,122 in the corresponding period last year; consolidated net sales, $37,290,978, against $38,035,530.

Circle Wire & Cable Corp., Maspeth, L. I., N. Y. Six months ended June 30, 1952: net earnings, $1,068,363, equal to $1.42 a share, against $1,182,059, or $1.57 a share, in the 1951 months.

Collins & Aikman Corp., New York, N. Y. Quarter ended May 31, 1952: net income, $278,648, equal to 50¢ a common share, against $792,542, or $1.40 a share, in the 1951 quarter.

Crown Cork & Seal Co., Baltimore, Md. Initial half, 1952: net profit, $381,423, equal to 9¢ a share, contrasted with $2,001,030, or $1.43 a share, a year earlier.

DeVilbiss Co., Toledo, O. Six months to June 30: net profit, $429,691, equal to $1.43 a share, against $486,371, or $1.62 a share, in the corresponding months of 1951.

Diamond Alkali Co., Cleveland, O. First six months, 1952: net income, $2,948,195, equal to $1.19 each on 2,260,603 common shares, contrasted with $3,412,134, or $1.51 a share, a year earlier, net sales, $38,738,466, against $38,957,467.

The Eagle-Picher Co., Cincinnati, O. and domestic subsidiaries. Six months to May 31, 1952: consolidated net profit, $1,709,647, equal to $1.73 a share, compared with $1,819,021, or $1.84 a share, in the 1951 period; net sales for the first half of 1952; $35,698,827, against $43,099,050 in the first half last year.

Endicott Johnson Corp., Endicott, N. Y. Six months ended May 31, 1952: net earnings, $1,994,621, equal to $2.28 a common share, contrasted with $879,724, or 91¢ a share, a year earlier.

General Electric Co., Schenectady, N. Y. June half, 1952: consolidated net income, $57,119,000, equal to $1.98 each on 28,845,927 capital shares, compared with $70,325,616, or $2.44 a share, in the like period last year; sales, $1,171,202,000, against $1,184,735,404.

General Motors Corp., New York, N. Y. First six months, 1952: consolidated net income, $269,048,085, equal to $3.01 a common share, against $280,583,134, or $3.13 a share, in the 1951 months; net sales, $3,868,560,341, against $3,881,237,447.

General Tire & Rubber Co., Akron, O., and subsidiaries. Six months ended May 31, 1952: net profit, $2,946,246; net sales, $88,935,317.

Johns-Manville Corp., New York, N. Y. First half, 1952: net earnings, $11,917,197, equal to $3.77 a common share, against $12,593,038, or $3.98 a share, in the corresponding half of 1951.

Koppers Co., Inc. Initial half, 1952: net profit, $4,772,786, equal to $2.40 a share, against $5,035,239, or $2.93 a share, in the 1951 half.

Monsanto Chemial Co., St. Louis, Mo. First six months, 1952: net profit, $11,100,852, equal to $2.05 each on 5,268,189 common shares, against $11,303,702, or $2.26 each on 4,868,189 shares, in the same months last year; sales, $126,329,292, against $139,743,030.

National Automotive Fibres, Inc., Trenton, N. J. First half, 1952: net income, $986,386, equal to 99¢ a common share, contrasted with $2,747,963, or $2.76 a share, in the like period last year.

Okonite Co., Passaic, N. J. Six months ended June 30: net profit, $1,056,731, equal to $7.08 a common share, compared with $745,117, or $4.99 a share, in the first half of 1951.

Phillips Petroleum Co., Bartlesville, Okla. Six months to June 30, 1952: net profit, $38,933,442, equal to $2.70 each on 14,440,495, shares, against $32,002,597, or $2.46 each on 12,997,006 shares, in the 1951 half.

Plymouth Rubber Co., Canton, Mass. Six months ended May 31, 1952: net loss, $294,653, contrasted with net profit of $531,009, or 59¢ a share, in the same period of 1951.

Struthers Wells Corp., Titusville, Pa. Six months ended May 31, 1952: net profit, $713,508, equal to $2.77 a common share, compared with $717,753, or $2.91 a share, in the like period last year.

Thermoid Co., Trenton, N. J. June half, 1952: net earnings, $502,824, equal to 55¢ a share, against $1,039,087, or $1.22 a share, a year earlier.

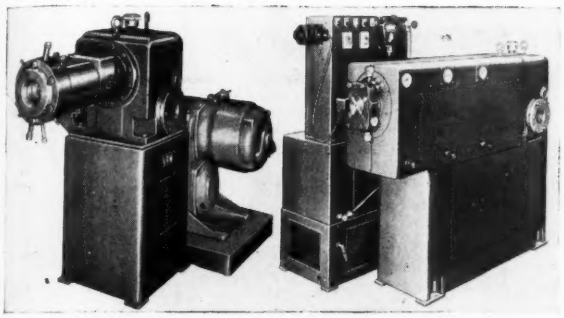
Westinghouse Air Brake Co., Wilmerding, Pa. First half, 1952: net income, $2,694,839, equal to 65¢ a share, against $3,229,099, or 78¢ a share, a year earlier.

(*Continued on page 706*)

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Anaconda Wire & Cable Co	Com.	$0.75	July 22	July 7
Boston Woven Hose & Rubber Co	Com.	0.75	Aug. 25	Aug. 15
Collins & Aikman Corp	Com.	0.40	Sept. 2	Aug. 19
Detroit Gasket & Mfg. Co	Com.	0.25	July 25	July 10
De Vilbiss Co	Com.	0.25 q.	July 21	July 11
E. I. du Pont de Nemours & Co., Inc	$4.50 Pfd.	1.12½ q.	July 25	July 10
	$3.50 Pfd.	0.87½ q.	July 25	July 10
General Motors Corp	$5.00 Pfd.	1.25 q.	Aug. 1	July 7
	$3.75 Pfd.	0.93¾ q.	Aug. 1	July 7
Goodyear Tire & Rubber Co	Com.	0.75 q.	Sept. 15	Aug. 15
	Pfd.	1.25 q.	Sept. 15	Aug. 15
International Rubber Co	Com.	0.10 sp.	Aug. 25	Aug. 5
Lee Rubber & Tire Corp	Com.	0.75 q.	Aug. 1	July 15
Link-Belt Co	Com.	0.60 q.	Sept. 2	Aug. 5
Seiberling Rubber Co	Com.	0.25 q.	Sept. 1	Aug. 11
	5% Pfd.	1.25 q.	Oct. 1	Sept. 15
	Pr. Pfd.	1.13 q.	Oct. 1	Sept. 15
Thermoid Co	$2.50 Pfd.	0.62½ q.	Aug. 1	July 14

New Machines and Appliances



New NRM Model 50 Extruders: (*Left*) 2½-Inch Rubber Extruder; and (*Right*) 2½-Inch Oil Heated Plastics Extruder.

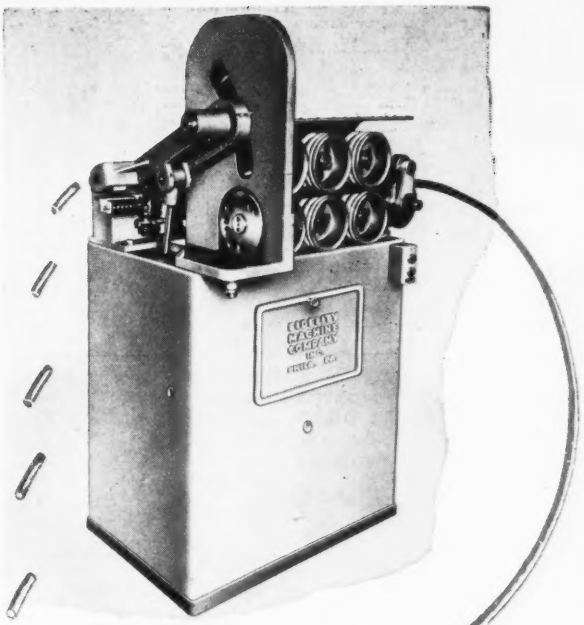
New Extruders

NEW Model 50 2½-inch rubber and plastics extruders have been announced by National Rubber Machinery Co., Akron 8, O. The rubber extruder is a heavy-duty production unit designed to make all standard rubber extrusions, including wire, cable, and hose covering. Having a nominal capacity of 200-250 pounds per hour, the extruder has the following features: single-flight, double-tipped screw with hardened flight surfaces, hollow bore for water cooling, and rotary union with cooling tube extending the full length of the screw; semi-steel cylinder barrel with circulating-type jackets and replaceable Xaloy liners; die adaptor head jacketed for either heating or cooling; feed box designed for either hand or mechanical strip feeding; self-contained heavy-duty worm gear reduction unit having a 15:1 ratio; and a new space-saving fabricated steel base. The extruder, less motor and accessories, which are available separately, has a net weight of 1,900 pounds.

The oil-heated plastics extruder is suitable for use with most thermoplastics and has a nominal capacity of 60-90 pounds or 1,400-2,400 cubic inches per hour. The chrome-plated alloy-steel screw has surface hardened flights, is hollow bored, and is fitted with a rotary union for fluid heating or cooling. Screws can be furnished in either full flighted or torpedo styles. The machine features a totally enclosed 15-hp. drive transmission with a heavy-duty cone worm gear reduction unit. Special consideration has been given so that the cylinder assembly, screws, dies, and die adaptor gate are interchangeable with other NRM 2½-inch oil-heated extruders. Other features of the machine

Neat Trick?

SEE PAGE 578



Cut Hose

automatically

at 45 pieces a minute with *NEW*

***Fidelity* Hose**

Measuring and Cutting Machines

Revolutionary in design, the Fidelity Automatic Hose Measuring and Cutting Machine enables you to reduce labor costs, improve quality, boost output, prevent waste, and save floor space.

The Fidelity feeds, measures, counts and *cuts* hose automatically to any preset length and holds the closest tolerances. It takes only a moment to change length or diameter. One operator can handle several of these new Cutting Machines. No special skills are required and the operation is 100% *safe.*

Let us send you full details on this new labor-saving development for cutting rubber. Write today for Catalog H.

Manufacturers of intricate precision machinery since 1911.

FIDELITY MACHINE COMPANY INC.

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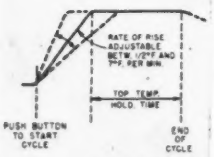
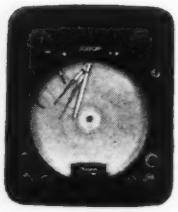
BETTER . . .
Time-Schedule Control at the push of a button!



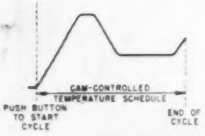
On equipment like vulcanizers and platen presses, you'll get precise time-schedule control like this, time after time . . .



With an M-40 Cyclelog Camless Controller

Desired control schedule is easily set in few seconds by convenient control knobs. Automatic control starts at push of button. Controls at desired rate of rise and holds at selected top temperature for any selected period of time. If desired, will also hold preset base temperature. Controlled rate of cooling optional. Push button repeats cycle exactly. No cams to cut, change, or adjust.

On Polymerizers and Reactors, you can duplicate accurate time-schedule control like this, day after day . . .



With an M-40 Cam-Set Controller

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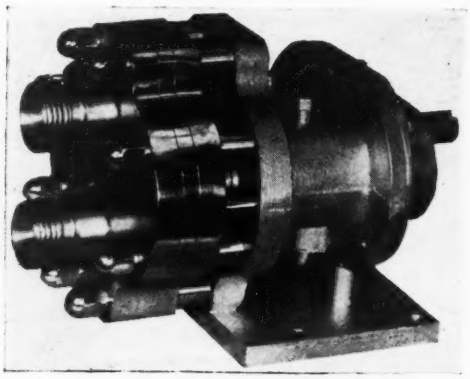

Marco Model L-100 Flow-Master Pump

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FLOW-MASTER pumps, originally developed as part of the processing machinery made by Marco Co., Inc., Third & Church Sts., Wilmington 50, Del., are now available from the company for use in the latex and process industries where highly efficient, stainless pumps are required. Positive displacement pumps with non-pulsating delivery, the pumps handle materials ranging from light, volatile liquids to heavy, viscous materials.

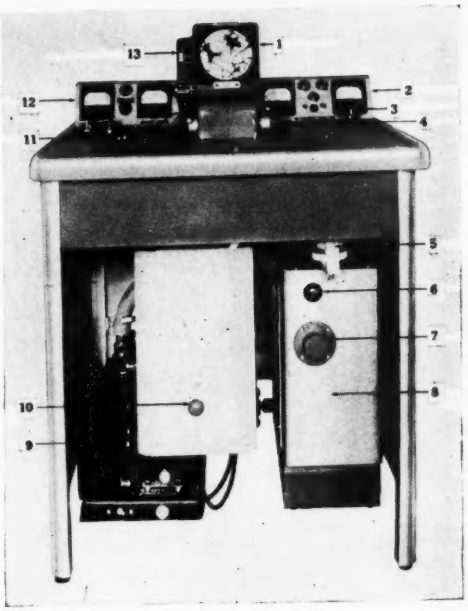
The rotors are hydraulically balanced by the material being pumped thereby avoiding severe metal-to-metal contact between the rotors and the stationary parts of the pumping chamber. Correct tolerances between the rotors and the stationary parts are maintained by a patented adjustable wear control mechanism. Other features of the pumps include maintenance of high vacuums; products not subjected to excessive mechanical friction; patented self-adjusting shaft seals; bearings run continuously in oil; no stuffing boxes or gaskets; and stainless metal construction.

Larger Flow-Master pumps are made in three styles: Victor, Deluxe, and Commander. Victor models are designed especially for use in hydraulics, metering, proportioning, and transferring of liquids. The Deluxe models are designed for heavy-duty use and will handle up to 4,000 gallons per hour against head pressures up to 100 psi. Commander model pumps are made in capacities up to 4,000 gallons per hour at working pressures up to 750 psi., and have water cooled fluid end seals. Smaller Flow-Master pumps are available in a Model L-series, with capacities ranging from 13.5-725 gallons per hour at a speed of 200 revolutions per minute.

Electron Microscope

THE availability of a new electrostatic electron microscope, Model EST 1, has been announced by Farrand Optical Co., Inc., Bronx Blvd. & 238th St., New York 70, N. Y. Incorporating design features developed after many years of research in electron optics, the new microscope is said to be as simple to operate as an ordinary light microscope. Simplified design also reduces service and maintenance requirements and makes it possible for the instrument to be used by other than highly skilled personnel.

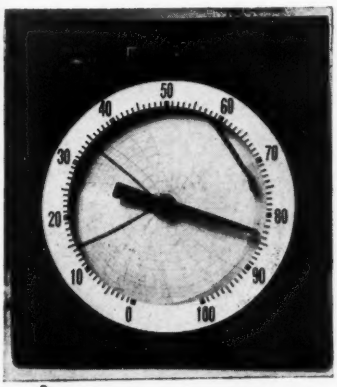
Claimed features of the new microscope include a resolving power of 30 au; freedom from astigmatism; ease of alinement; distortionless image at all magnifications; and consistent high image quality at direct magnifications up to 20,000X. Of particular importance in stereo studies is the fact that the image of the specimen does not rotate with changes in magnification. The electron gun is of high intensity, efficient, has quickly replaceable filaments, and can be adjusted for pinhole position and beam alinement while in operation. The specimen holder permits manipulation in three translational motions.



Farrand Electrostatic Electron Microscope: (1) Viewing Screen; (2) High-Voltage Meters; (3) Power Supply Controls; (4) Pumping Valves; (5) Dessicator; (6) Gun Bias; (7) Magnification Control; (8) High-Voltage Power Supply; (9) Fore Pump; (10) Diffusion Pump Indicator Light; (11) Camera Cable Release; (12) Vacuum Gages; and (13) Camera and Plate Holder

The power supply is small, compact, and easy to service. A variable output voltage permits operation over a wide range without changing the focus. The instrument also incorporates a large area viewing screen and has a built-in camera arrangement without an air lock. The microscope is adaptable for electron diffraction techniques and stereo electron micrographs.

Liquid Level and Flow Instrument



ElectroniK Inductance Bridge Receiver

THE ElectroniK inductance bridge receiver, a new instrument for the measurement and control of flow and liquid level, has been developed by the Minneapolis-Honeywell Regulator Co., Philadelphia 44, Pa. The new instrument can be utilized with any of the standard inductance bridge transmitters to indicate, record, integrate, and control flow and liquid level. Data can also be retransmitted pneumatically to a second receiver remotely located. An Indexet mechanism is also available to reset the control index from a remotely located transmitter. The single receiver, therefore, combines a number of functions which formerly required the use of two instruments.

Accurate to within ±0.5% of the full scale, the new instrument combines the time-proven inductance bridge transmission system with the company's "Continuous Balance System" for power positioning of the pen. Since the torque required to operate the recorder and associated devices is derived fom the amplifier of a continuous balance system, the pen places no load on the primary element, and the dead zone does not increase with the addition of control or auxiliary devices. Easily installed to replace an older inductance bridge receiver, the new instrument does not require any special provisions or extra equipment.

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FRANCE

Rubber Processing

A few of the papers read at the XXIV International Congress of Industrial Chemistry, held in Paris during November-December, 1951, have just been published by *Revue Générale du Caoutchouc*. In one of these,[1] P. Compagnon and M. Liponski, of the Rubber Research Institute of Indo-China, discuss the preparation of natural rubber-carbon black master batches by simultaneous coagulation of latex and carbon black dispersions..

It seems that work in this direction had been started some time ago, and during the war years very serviceable latex-carbon black mixes containing up to 60% of black (on the rubber content), had been developed on the Chup Plantations, Indo-China.

In 1944 and 1945, almost 600 tires had been made from mixes of this type, as well as a variety of mechanical parts. The properties of these articles were satisfactory despite the fact that locally made carbon black had to be used, and it was therefore felt that quality would have been much better if the proved, regular American types of carbon blacks could have been employed. With this in mind, research along these lines was recently resumed, when the latex was mixed with dispersions of channel blacks (EPC and MPC) apparently the preferred types in Europe.

The mixes could be readily prepared and as much as 100% and more of carbon black could be incorporated in the latex; however, such highly loaded mixes were difficult to process, and investigations were limited to compounds containing 50 and 75 parts of carbon black, respectively, per 100 parts of rubber, dispersions were prepared both with the aid of Darvan as dispersing agent, and by treatment in ball mill. The latter type of dispersion slightly increases the rate of coagulation; while the former has the opposite effect and necessitates the use of far more acid for coagulation. This disadvantage, however, is offset by the greater ease with which such dispersions can be made. With both types all the rubber in the latex is coagulated, and a good part of the natural anti-oxidants and accelerators are also retained, with benefit to the properties of the final vulcanizates.

The master batches thus prepared have a high consistency (high consistometer value) which, however, can be reduced by the addition of a peptizing agent, like Renacit IV; it is nevertheless noted that despite the high consistency the batches are very rapidly plasticized. A further advantage of the method is that waste of carbon black is cut to very small proportions. Tested for mechanical properties, vulcanizates showed distinctly higher modulus, improved breaking load, fairly long curing plateau, little change in elongation at break, generally higher Shore hardness, than controls; mixes scorched rather more readily than controls.

In a second paper,[2] G. Giger reports on tests made on an industrial scale with the use of peptized rubbers. Laboratory tests had demonstrated the advantages of the use of rubbers peptized on the estate, and it was decided at the Institut Français du Caoutchouc to carry out similar tests on a factory scale. For this purpose two Banbury-type internal mixers (No. 3A and No. 11) were used. Ordinary crude rubber, rubber peptized by the addition of peptizers at the beginning of milling operations, and rubber peptized by incorporating peptizers in the latex before coagulation, were plasticized to a Mooney 50 (as in the laboratory). Results wholly confirmed those previously obtained in the laboratory: the saving in energy and time when estate-peptized rubbers were used instead of ordinary crude rubbers was considerable and was still substantial as against rubber peptized on the mill; at the same time the properties of the estate-peptized rubbers were comparable to those of the ordinary rubber mixes.

[1] 29, 4, 272 (1952).
[2] *Ibid.*, p. 275.

Cyclized Rubber

The various methods of preparing cyclized rubber are reviewed in the first of two articles on cyclized rubber, by G. J. van Veersen[1] who himself recently developed a cyclized rubber from latex with the aid of sulfuric acid. Mr. van Veersen discusses the various structural formulae ascribed by different authors to cyclized rubber and suggests a formula which agrees

[1] *Rev. gén caoutchouc*, 28, 1, 34 (1951).

with Farmer's conception of an intermolecular olefinic polymerization of rubber and must include one double-bond; however, the exact position of the double-bond is not yet known.

It is noted that the conversion of raw to cyclized rubber is accompanied by a gradual increase in brittle point due to the formation of condensed polycyclohexyl groups in the rubber molecules and that when the ratio, polycyclohexyl groups to polyisoprene chains, is sufficiently high, a brittle resin results. In this connection attention is called to the properties of a resin containing about 90% abietic acid, whose structure reveals the same condensed polycyclohexyl groups.

Many uses have been found for cyclized rubbers, among others that of reinforcing filler for natural rubber, a subject discussed by G. J. van Veersen and B. B. S. T. Boonstra.[2]

The usual difficulties encountered in preparing combinations of natural and cyclized rubbers are avoided when the rubber has been cyclized in the latex, the authors claim, and add that they have been able to obtain a finely dispersed cyclorubber latex readily mixed with natural rubber latex. Vulcanizates having excellent properties were obtained, and a whole series of products possessing any degree of rigidity could be prepared.

Latices including increasing proportions of cyclorubber were made by mixing 60% centrifuged natural latex with a cyclized rubber latex (60% solids content). To 100 parts of rubber were added two parts of ZnO, one part diethyldithiocarbamate of zinc, and two parts of sulfur in aqueous dispersion stabilized with Darvan. Sheets cast on glass from the mixtures, dried, and cured, showed decreasing elongation and resilience, but higher hardness, rigidity, and permanent set, with increasing proportions of cyclorubber. A vulcanizate containing 20% cyclorubber had a tensile of 214 kg/cm^2, Shore hardness 51, relatively good resilience, and permanent set.

The authors point out that since a mixture of natural rubber latex and cyclolatex behaves largely like a normal latex, such a combination may be treated by the usual methods for ordinary latex—thus it could be used in the Kaysam process. Again since the density of cyclolatex is 1, there is no danger of deposits forming, as there would be in the case of mineral fillers. Since the low modulus of latex thread makes work on textile machines difficult, it is suggested that the incorporation of cyclolatex in thread compound would increase rigidity and facilitate operations with latex thread.

Summing up, it is pointed out that while results of tests in general agreed with those of Thies, it was found that rubber cyclized from latex leads to vulcanizates which are more rigid, probably because of the higher degree of dispersion; surprisingly enough, the higher rigidity is accompanied by high resilience.

A comparison of the mechanical properties of two vulcanizates, including equal proportions, respectively, of cyclized rubber and Pliolite S 6, showed similar tensile strength, hardness, and brittle point, but the cyclorubber mix was more rigid, and its Lupke resilience—contrary to expectations—was higher than that of the Pliolite mix.

Other tests showed that by comparison with carbon black compounds, the phenomenon known as the Mullins effect is weaker; and that tire compounds containing cyclorubber have a very high coefficient of friction, particularly on asphalt-rubber powder surfaces. Finally, it is suggested that the use of cyclorubber would permit the manufacture of products in various colors, and that the low density of vulcanizates containing cyclorubber, leading to a reduction in dead weight, should make them advantageous for the manufacture of airplane tires.

[2] *Ibid.*, p. 35.

Seek Licenses to Make Rubber Goods

Société Anonyme des Etablissements DUBO—Anciens Ets. A. Dumothier & J. Beau, manufacturer of rubber and rubber articles, principally rubber shoes, Route du Vieux-Doulon, Nantes Doulon (Loire-Inférieure) is interested in entering into licensing arrangements with an American firm to manufacture United States patented rubber products in France.

Another firm seeking such an arrangement is Société Perigourdine de Pantoufles, "S.O.P.E.P.," manufacturer of slippers and summer shoes, 7 Rue Ste. Claire, Périgueux, Dordogne, which wishes a license from an American company for the manufacture and distribution in France and the rest of Europe of slippers and vulcanized or molded shoes, or any new processed articles.

Société Chromex, manufacturer of oil seals of leather and chrome, 2 Rue Tirebarbe, Lardy (Seine-et-Oise), wishes to manufacture in France under U. S. license oil seals of synthetic rubber. The company is willing to send an executive to the United States for the purpose of negotiation.

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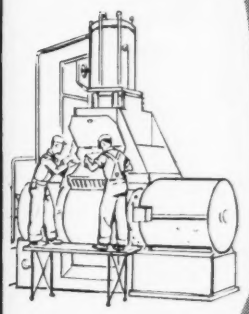

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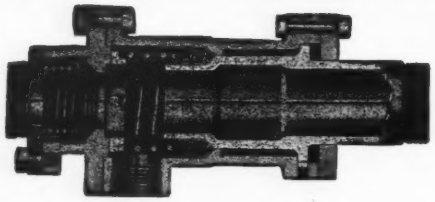

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Textiles in the Rubber Industry

The possibilities of ramie fiber, which have for some years been occupying American interests, are now being called to the attention of rubber manufacturers in France. In the June, 1952, issue of *Revue Générale du Caoutchouc*, mainly devoted to presenting the role of textiles in the rubber industry, M. Lefort[1] discusses the cultivation, output, preparation, and properties of Ramie.[1] It is shown that by comparison with cotton and rayon, ramie fiber is chiefly remarkable for its high tensile strength, which even increases in the presence of moisture, and its good adhesion to rubber; on the other hand, its resistance to torsion is definitely inferior to that of cotton.

If ramie, despite its outstanding qualities, has so far not found the use it seems to deserve, in Europe, the reason is the irregular and restricted supply of the fiber due mainly to the difficulties (decortication and degumming) hitherto encountered in its preparation. These have apparently now been overcome, and the prospects for the extended use of the fiber should be good. In the rubber industry, it is suggested, its special properties should make it particularly suitable for use in transmission belting and pneumatic tires.

An article on "Xetal 50"[2] indicates that Société Franterre, which obtained exclusive rights to manufacture and sell positive latex in France and Italy, started to market its product about a year ago under the name of Xetal 50. Tests are under way to extend its use, and it is being tried with synthetic fibers and also in the glass and natural leather industries.

A note on the use of rayon in the tire industry[3] reveals that the production of high-tenacity rayon for tire carcasses in France rose from 39 tons in 1939 to 5,600 tons in 1946, 7,100 tons in 1948, and to 8,234 tons in 1949. Present rate of production is put at about 18,000 tons annually.

[1] P. 390.
[2] *Ibid.*, p. 398.
[3] *Ibid.*, p. 416.

Adhesion of Rayon Cord to Synthetic Rubber

A translation[1] of extracts of a German article by E. Profft which originally appeared in *Chemiker Zeitung*[2] tells of a new method for improving the adhesion of rayon cord to synthetic rubber. After the effect of various substances had been tried with but meager success, the author decided to experiment with nitrogen compounds. Somewhat better results were obtained when rayon cord was treated with solutions of aliphatic or heterocyclic nitrogen compounds, but the improvement in adhesion became remarkable when aromatic nitrogen compounds were used, specifically m-phenylene diamine. There is a marked difference in the effect of the different isomers of the phenylene diamine; o-phenylene diamine, curiously enough, has hardly any effect on the adhesive qualities of rayon with regard to rubber, but there is an 80% improvement when the *para* isomer is used, and 291% with the *meta* isomer.

Another surprising observation was that to a limit of 1%, the weaker the concentration of m-phenylene diamine was, the more marked the improvement in adhesion; thus with 4.5, 2.0 and 1.0% solutions, average values of 359, 386, and 521, respectively were found, (where the control value was 100); in the last instance, the value was based on values including that for a 1% solution which had already been used once before.

It is added that since m-phenylene diamine is generally used as the hydrochlorate,, and cords treated with this substance turn a dark red-brown color and lose much of their strength, the solution must first be neutralized with soda solution, when results are as satisfactory as with the diamine itself.

[1] *Rev. gén. caoutchouc*, 29, 6, 409 (1952).
[2] 75, 223 (1951).

Rubber Trade Notes

Research facilities of the Institut Français du Caoutchouc at 42 Rue Scheffer, Paris, recently were enlarged by the addition of a third building, officially opened June 27. The new laboratories, provided for chemists, physicists, engineers, and agriculturalists, have been equipped with the most up-to-date apparatus. The I.F.C., it may be added, takes pride in the fact that it has the most extensive rubber library in all France.

French production of tires and tubes in the first quarter of 1952 came to 44,764 metric tons, against 40,510 tons in the corresponding period of 1951.

GERMANY

In March, 1952, output of Buna at the Huls Chemical Works, near Dusseldorf (Western Germany), came to only about 300 tons, a rather drastic reduction from the 500 tons monthly average envisaged when production of the synthetic rubber was resumed late in 1951.

Lower prices for natural rubber and the inability to meet quotations for American synthetic rubber were threatening to force the cessation of Buna production here. But, it is learned, a price equalization fund to aid local production of synthetic rubber has been decreed by Economics Minister Ludwig Erhard after consultation with the rubber manufacturing industry. For every kilogram (2.2 pounds) of natural or imported synthetic rubber he uses, a manufacturer will have to pay 20 pfennigs (about 5¢) into the fund, thereby making it possible to sell Buna at a competitive price. Industry representatives will administer the fund.

Local rubber manufacturers feel that it is necessary to continue the production of Buna in Germany, not only because the special qualities of the material make it indispensible for certain purposes, and Germany cannot afford foreign exchange for imported synthetics, but also because of a natural desire to keep up synthetic rubber research here where Buna was first developed.

Another point of view was revealed by the president of Phoenix Rubber, Hamburg, who reportedly stated that immediately after the war Firestone had begun to urge the revival of German Buna production on the ground that German research ought to contribute its share toward the future development of synthetic rubber.

The results of the Achema X Exhibition of Chemical Equipment and of the European Convention of Chemical Engineering, which took place in Frankfurt a.M., May 18-25, were reported to have exceeded all expectations.

The European Convention of Chemical Engineering had the cooperation of 21 scientific and technical societies from a dozen West European Countries. The board of honorary presidents of the convention was composed of 29 experts from many different countries. At a meeting of the board held May 20 it was resolved that the board be kept in existence until the next convention of this kind so as to insure continuance of European cooperation in chemical engineering. A special committee was elected including: Herbert Bretschneider (Germany); Jean Gerard, founder and vice president of the Société de Chimie Industrielle, (France); Francis A. Freeth (Great Britain); and Luigi Morandi, president of the Lombard Section, Soc. Chimica Italiana (Italy).

FAR EAST

MALAYA

Rubber Outlook Unfavorable

The recent slump in the price of rubber has had the effect of pointing up the divergence of opinion on the outlook for rubber and the question of whether positive aid from America can be expected in solving the difficulties into which the drop in prices threatens to plunge Malaya.

Perhaps it is no accident that some of the most responsible Europeans, in their public utterances, have expressed their confidence both in the future of Malayan rubber industry and in America's active good will, even where, as in case of recent comments by the High Commissioner, Sir Gerald Templer, the gravity of the situation is emphasized. His Excellency had brought out that an average price of 88 Straits cents per pound for the rest of the year would entail a loss in export duty revenue of $53,000,000, and then went on to say:

"It would indeed be a tragedy if despite the tenacity, courage, and sacrifices of the planters and estate workers during the past four years, our efforts in the fight against Communists were to be . . . . undermined by economic reverses."

"The immediate problem is to try and hold the situation for the next two or three years. After that, in the long term, I believe there is good reason for confidence in the future of natural rubber, but it will have to learn to live alongside synthetic.

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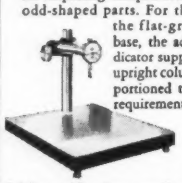
Ames No. 13 features flat-ground, cast-iron base of ample size for using V-blocks and locating fixtures. The No. 13 can be fitted with a fine adjustment for close setting. Adjustable bracket holds any Ames Indicator.



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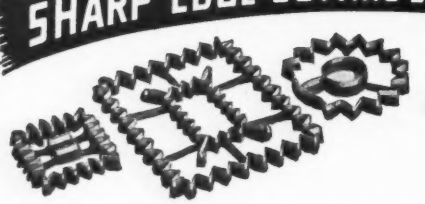

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"We know very well that the United States is fully aware of the importance of rubber in southeast Asia, and we are confident that they will order their rubber policy with wider consideration in mind than solely the protection of their own synthetic rubber industry."

H. H. Facer, Federal Legislative Councillor and one of the Malayan producers at the Rubber Study Group meetings in Ottawa, on his return to Malaya expressed the opinion that Americans were just as worried about the rubber situation as Malayan producers; he felt that the discussions in Washington, after the Ottawa conference, had impressed Americans considerably and were very useful to the Malayan producer. Mr. Facer thought that the drop in the price of rubber, which occurred while he was in Ottawa, was largely psychological, after the drop in the price of synthetic rubber.

Rubber dealers, the trade unions, and the Labor Party want quick drastic changes; they are less willing to believe in America's good will toward the Malayan rubber industry, and they make no bones about their feelings.

The chairman of the Malacca Estate Staff Union, at a general meeting, strongly criticized the present rubber policy which ties Malaya to the apronstrings of the United States, he said. He cited the example of Ceylon which did not worry about America, but simply went on selling rubber to whomever it pleased, to the highest bidder, made profits, and was rewarded for its recalcitrance by the offer from the United States to buy 100,000 tons of rubber annually!

"It is a good lesson to Malaya," he concluded.

The Singapore Labor Party has on various occasions hinted at the desirability of selling rubber to Russia and recently decided to ask the British Government to permit rubber exports to Russia and Red China.

At a conference of the Malayan Trade Union Council, delegates demanded nationalization of tin and rubber industries.

Assurance that there was no official American intent to depress deliberately the price of natural rubber was offered rubber growers by H. C. Bugbee, associate director of the Natural Rubber Bureau in Washington, who came to Malaya in the latter half of June on a two-week tour to study, among other things, the effect of the emergency on production of rubber. Americans fully realized the part Malaya has played in producing rubber for the American stockpile and in fighting Communism, he stated, and added that American legislation is not less favorable to rubber now than it was four years ago. He was optimistic about the future of rubber, declaring that the next decade would see demand reaching a point that would tax the combined production facilities of natural and synthetic rubber.

Wage Rate Difficulties

Early in June, discussions were started between the Malayan Planting Industries Employers Association and the Plantation Workers' Unions on the new wage rates that were to be fixed for the third quarter of 1952.

Wages are supposed to be based on the average price of rubber during a three-month period. Wage rates vary according to whether payment is made on the task system (number of trees tapped), or whether the worker is a check roll tapper, a contract tapper, or a field worker. While the price of rubber is between $1 and $1.50 (Straits currency) per pound, the task tapper gets between $2.60 and $4.60 a day; a check-roll tapper makes $3.00 daily; a contract tapper, $3.80; and a field worker $2.30 a day. The wage includes a "prosperity factor" (which operates only when the price of rubber is from $1 to $2 per pound) which may account for from 45 to 90 cents of the daily pay. Employers first proposed a cut in wages of 15%, since the average price of rubber for the second quarter had fallen below $1 per pound (Straits); this the unions rejected; they refused to agree to any cut in wages on the ground that the cost of living in Malaya had not been affected by the fall in the price of rubber; furthermore, they contended, prices were still unsettled, and they asked for a "truce" period of three months during which wages would remain unchanged. If after that period price levels were the same as now, negotiations would be resumed.

The employers then made a new offer—basic pay, bonuses, and allowances were to be maintained, but the prosperity factor should be reduced. Negotiations collapsed, and at last reports the government had decided to intervene in the dispute.

CEYLON

Yet another shipment of Ceylon rubber left Colombo for Red China last May. This time 4,700 tons were shipped by the Polish vessel *Kilinski*. Hardly had it left, than a second Polish vessel, chartered by Chinese rubber buyers, arrived to take on 6,000 tons of rubber. But it appears that only 2,000 tons of sheet rubber—the Chinese will buy no other quality—could be made available for shipment.

Late reports indicate that the new Prime Minister, Dudley Senanayake, who recently succeeded his father after the latter had been killed in a fall from a bolting horse, will take steps to restrict, if not to bar completely, rubber exports to Red China. About 15,000 long tons of Ceylon rubber have been shipped to China in the last eight months. The Prime Minister also revealed that just before his father's death the United States had offered to buy Ceylon's exportable rubber, amounting to about 100,000 tons annually.

INDO-CHINA

According to data published by the Secretariat of the Rubber Study Group, 1951 rubber exports from Viet-Nam and Cambodia totaled 52,302 long tons, of which 34,213 tons went to France, and 12,331 tons to the United States. The total included 35,212 tons of sheet, 4,286 tons sole crepe, 8,876 tons other crepe, 3,072 Sernambys, and 856 tons latex.

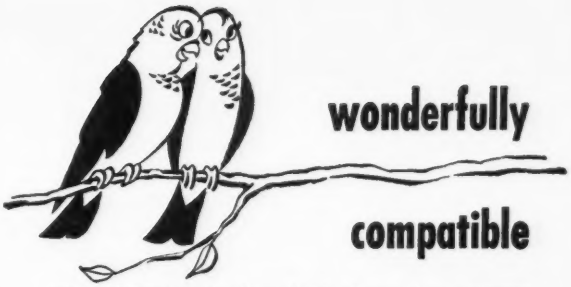
To aid the military program the Mutual Security Agency, through its special Technical and Economic Mission, recently supplied $100,000 (American) to the Indo-China state of Viet-Nam to equip and supply with raw materials the first modern retreading plant in this area. The plant, operated by Cong Ty Cao-Su & Co., a Viet-Nam concern in which an American firm holds stock, is expected to produce 4,000 to 4,500 retreaded tires a month on a 24-hour, round-the-clock schedule.

LIBERIA

The present area under rubber in Liberia is put at about 80,000 acres, yielding some 35,000 tons of dry rubber annually. About 95% of this comes from the Firestone plantations. Exports of rubber from Liberia totaled 28,529 tons, value $11,063,306 in 1949 and 34,238 tons, value $15,005,603 in 1950. Rubber constituted almost 90% of the country's total exports in the last few years.

Neat Trick?

SEE PAGE 578



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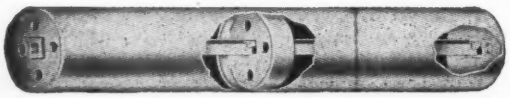

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Editor's Book Table

BOOK REVIEWS

"Vinyl and Related Polymers." Calvin E. Schildnect. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Cloth, 6 by 9 inches, 734 pages. Price, $12.50.

This survey of the vinyl-type polymers emphasizes the practical chemistry and physics of polymerization and polymers, the basic inventions, the methods of synthesis, and the advantages and limitations of the products. The comprehensive scope of the book is demonstrated by the inclusion of more than 4,000 references, many of which are patents, for the period from 1835 to the second half of 1951. Major emphasis is placed on those polymers having industrial importance, but practically every vinyl-type polymer which has been prepared to date is given at least some mention. In addition to chemistry, practical aspects are covered by the inclusion of data tables, polymerization recipes, polymer proeprties, and industrial applications.

The first chapter presents an introduction to polymer science by discussing styrene polymerization, and is followed by a chapter on styrene copolymerization, with appropriate emphasis on synthetic rubbers. Succeeding chapters continue the systematic presentation and cover styrene derivatives and related polymers; methacrylic and acrylic ester polymers; acrylonitrile, acrylic acid, and related polymers; polymers from vinyl acetate and related monomers; vinyl chloride polymers; vinylidene chloride and fluorovinyl polymers; ethylene high polymers and copolymers; isobutylene high polymers and copolymers; vinyl ether polymers; sulfur-vinyl compounds; nitrogen-vinyl polymers; and vinyl ketone and miscellaneous polymers. Besides a subject index, there is an appendix containing lists of publications frequently cited; companies and organizations cited; and dates of British, French, German, and United States patents.

"Modern Chemical Processes." Volume II. By the Editors of *Industrial and Engineering Chemistry*. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 8 by 11 inches, 299 pages. Price, $5.

This second volume of the series presents 24 factual and authoritative articles on recently developed chemical processes now in operation on a full-scale production level. The articles, prepared by the editors of *Industrial and Engineering Chemistry* in conjunction with the technical staffs of cooperating organizations and originally published in that magazine, include background material, description of plant installation, plant process and operation, economics of the process, personnel, and future prospects.

The current volume contains articles on chemicals from fats; amyl compounds from pentane; phenol by sulfonation; TNT into phloroglucinol; commercial development of glyoxal; bacitracin; reagent-grade chemicals; lithium and its compounds; calcium cyanamide; cyanides from the coke oven; pioneer surfactant; edible oils; cane sugar refining; brewing; food yeast from sulfite liquor; modern winemaking; platinum reforming of gasoline; liquid fuels from oil shale; modern sulfur mining; sulfur from sour gases;; magnesia-base sulfite pulping; kraft pulp production; kraft papermaking; and rubber reclaiming. The article on rubber reclaiming was prepared in collaboraion with D. S. le Beau, Midwest Rubber Reclaiming Co.

NEW PUBLICATIONS

"The Consulting Chemist and Chemical Engineer in a World Economy, 1952." Association of Consulting Chemists & Chemical Engineers, Inc., 50 E. 41st St., New York 17, N. Y. Paper, 8½ by 11 inches, 32 pages. Price, $1. This publication details the requirements for compatible and constructive relations between a client and a chemical consultant. Subjects covered include advantages of using consultants, selection of consultants, consulting services, and remuneration. Typical case histories of problems solved by consultants are given, and there is a brief discussion of the Association and its work.

"Pittsburgh PX Plasticizers." Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh 19, Pa. 16 pages. This illustrated booklet discusses the use of plasticizers in vinyl plastics, the company's plasticizer manufacturing processes, and the properties and uses of 10 PX plasticizers.

"Research, Development, Production." The General Tire & Rubber Co., Akron, O. 8 pages. Concise information appears on the company's chemical products: Ko-Bland insoluble sulfur; Gen-Tac synthetic vinyl pyridine latex for tire fabric dipping; Gen-Tac water soluble resin for fabric adhesive dips; Kalabond RM-2 rubber-to-metal adhesive; Kalabond TC-149 tie cement; Polystop shortstops for the manufacture of GR-S; Hy-Blo C blowing agent; Hetro TT reinforcing elastomer; Polycure thiuram and carbamate accelerators; Polygen oil-enriched cold rubber; Actogen BK accelerator-activator; and Genpol F-10 ozone-resistant lacquer for rubber goods. Exclusive sales agent in the United States for Hetro TT and Polygen is H. Muehlstein & Co., Inc.

"Effect of Neoprene on Smudging Characteristics of Carbon Black Colored Papers." PR-2. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 8 pages. Results of tests show that small percentages of Neoprene Latex Type 735 in the manufacture of carbon papers reduces smudging, increases opacity, permits a reduction in the amount of filler needed to produce a given depth of color, and improves wet strength.

Publications of J. M. Huber Corp., 100 Park Ave., New York 17, N. Y. **"Huber Carbon Blacks and Electrical Conductance."** 8 pages. This report describes a study made of the effects of various carbon blacks on the electrical conductivity of typical vulcanized natural, GR-S, neoprene, butyl and nitrile rubber compounds. Effects of carbon black loading, type, and dispersion are discussed, and the testing procedure is explained.

"The Effect of Stearic Acid on the Physical Properties of Tire Tread Compounds Produced from Various Types of GR-S Pigmented with High Abrasion Furnace Black." 8 pages. Data show the effect of stearic acid on the physical properties of GR-S tread compounds pigmented with HAF black and accelerated with MBTS-Aktone. Hot, cold, and oil extended polymers were used in the test recipes.

"A Few Facts about Dehumidification for Industry." Abbeon Supply Co., New York, N. Y. 4 pages. This bulletin discusses humidity and its effects, the various methods used to remove moisture from the air, and a number of instruments designed to determine moisture content of air.

Technical information bulletins by Carbide & Carbon Chemicals Co., New York, N. Y. **"2-Ethylhexanol."** Bulletin F-7908. 4 pages. Properties, shipping data, and applications for the chemical are given, including use as a solvent for rubber, resins, and waxes; dispersing and wetting agent for clays and pigments; and defoaming agent for paper and textiles. **"n-Butyl Alcohol."** Bulletin F-7909. 4 pages. Complete property, solubility, and shipping data appear for this alcohol. In addition to use as a solvent for coating resins, the alcohol is also an intermediate for the preparation of plastics, rubber accelerators, plasticizers, and dyestuffs.

"Dayton Thorobred Truck Tire Data Book." Dayton Rubber Co., Dayton 1, O. 40 pages. Complete specifications, technical data, and information on the design and construction of the company's truck tires are given in this loose-leaf booklet, available to all truck tire users. A feature of the booklet is the listing of 10 rules, accompanied by explanations and valuable data tables, outlining methods of obtaining lowest cost per tire mile. These rules cover tire selection, inflation, load distribution, reduction of tire heat build-up, tire rotation, inspection, recapping, tire and tube mounting, minor repairs, and correct rim sizes.

"Fundamentals of Instrumentation for the Industries." Booklet 80-2. Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Philadelphia 44, Pa. 128 pages. As indicated by the title, this illustrated booklet covers the fundamentals of measurement, control, and transmission of process variables in industry. Types of controllers, control elements, power units, and control systems are discussed in detail, and typical industrial applications of the different instruments are described.

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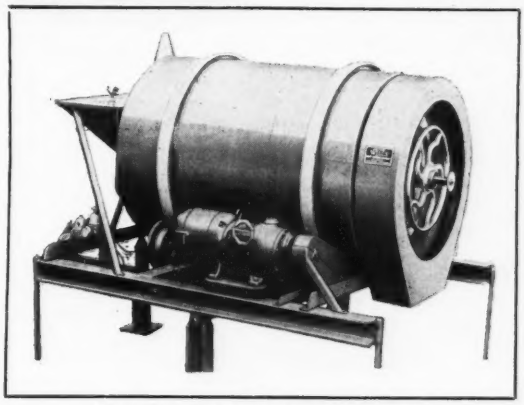

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"Recommended Procedures for Upholstering with Firestone Velon Flex All-Plastic Material." Firestone Plastics Co., Pottstown, Pa. This 19- by 24-inch wall chart was prepared for use in upholsterers' workrooms. Diagrams illustrate correct procedures for frame preparation, cutting, welting, stitching, tacking, breathers, and other upholstering steps.

"Temperature Resistant Parkone O-Rings." Catalog File 5160A1. Parker Appliance Co., Cleveland 12, O. 4 pages. Properties of five Parkone compounds for extreme temperature resistance are given in this catalog, together with complete dimensional data on the company's precision O-rings molded from these compounds.

"Witco Di-(2-Ethylhexyl) Adipate (DOA)." Technical Service Report E-3. Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. 2 pages. This report describes the properties and applications of the ester, an outstanding primary plasticizer for imparting low-temperature flexibility in vinyl and cellulosic resins and synthetic rubbers.

"Lustrex X-700 Series Water Soluble Resins." Monsanto Chemical Co., Springfield, Mass. Data are given in this bulletin on the build-in adhesive characteristics and mechanical stability of the X-700 styrene latices. Information on typical formulations, plasticizer applications, solvents, fillers, and blends with polyvinyl acetate and rubber latices is also presented.

"Plax for Plastics." Plax Corp., West Hartford, Conn. 8 pages. This new illustrated catalog covers properties, primary uses, and available forms of polyethylene, Kel-F, polystyrene, and methacrylate. The company's services in product development, fabricating, styling, packaging, and merchandising are also described.

"The Rubber Formulary, A Service to Compounders." The Rubber Formulary, Bakersfield, Calif. 20 pages. This 1952 bulletin describes the latest developments in this company's monthly abstracting service which provides punched cards giving the formulations and properties of elastomer compounds appearing in the technical literature.

"Hercules Neolyn Resins." Hercules Powder Co., Wilmington, Del. 18 pages. This booklet presents practical application data and starting formulations for the use of Neolyn resins in adhesives, plastics, organosols, and lacquers. Data are included on the properties of the resins, which are rosin derived alkyd-type materials.

"Technical Cooperation with Underdeveloped Countries." Philip C. Newman, John E. Ullman, and Robert S. Aries. Chemonomics, Inc., 400 Madison Ave., New York 17, N. Y. Paper, 6 by 9 inches, 140 pages. Price, $5. Both theoretical and practical aspects of industrial planning for undeveloped areas are discussed in this book. Methods of industrialization which have been used in the past are described, as well as details and potentials of Point 4 industrialization. Emphasis is placed on the activities of local governments, national and international organizations, and action by private investors.

"Battelle Research in Engineering Economics." Battelle Memorial Institute, Columbus 1, O. 16 pages. Topics covered in this booklet include the value of engineering economics in management planning, the scope of Battelle's activities in this field, case histories of research in engineering economics, and Battelle personnel for research in this field.

"Tiger Talk." Latex & Rubber, Inc., Baltimore 30, Md. 3 pages. This is the first of a series of letters by the company on developments in rubber quality, properties, testing procedures, and packing. Topics discussed in this issue include curing characteristics, ozone cracking, and technically classified rubber.

"Ortho-Ethylnitrobenzene, Ortho-Ethylaniline." Technical Bulletin No. 0-79. Monsanto Chemical Co., St. Louis 4, Mo. 14 pages. Properties, chemical reactions, suggested applications, and handling information are presented on o-ethylnitrobenzene and o-ethylaniline. Suggested uses include intermediates for the manufacture of rubber chemicals, dyestuffs, and pharmaceuticals.

"The Vanderbilt News." Vol. 18, No. 4, July-August, 1952. R. T. Vanderbilt Co., Inc., 230 Park Ave., New York 17, N. Y. 24 pages. This issue of the *News* presents extensive test data on the practical loading range with P-33 and Thermax blacks in natural and synthetic rubbers, and the effect on properties and curing characteristics of these blacks when used in mixed loadings with MPC black in natural rubber, and with MPC and HAF blacks in cold rubber

"Midco-B with an Oil-GR-S Masterbatch. I." Report No. 17. Midwest Rubber Reclaiming Co., East St. Louis, Ill. 4 pages. Laboratory test data show that Midco-B reclaim gives the same results in X-628, an oil masterbatch, as it does in straight cold rubber GR-S-100.

"Plasticizers." Dow Chemical Co., Midland, Mich. 22 pages. Designed to assist manufacturers in making the proper selection of plasticizers for plastics compounding, this bulletin gives the sales specifications, typical properties, compatibilities or solubilities, and uses of six Dow plasticizers.

Publications of the British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts., England. No. 155 **"The Velocity Coefficients of the Chain Propagation and Termination Reactions in Olefin Oxidations in Liquid Systems."** L. Bateman, G. Gee, A. L. Morris, and W. F. Watson. 10 pages. This is a report of an investigation of the kinetics of the liquid-phase oxidation of olefins to study the relative importance of the three termination reactions, and to attempt to obtain more reliable estimates of the absolute velocity coefficients.

No. 156 **"The Rubber Hydrocarbon in Freshly Tapped *Hevea* Latex."** George F. Bloomfield. 13 pages. This paper summarizes the results of recent investigations in Malaya to characterize the rubber hydrocarbon in fresh *Hevea* latex with respect to its molecular weight as obtained by viscometric and osmotic measurements, and its molecular weight distribution as revealed by fractionation.

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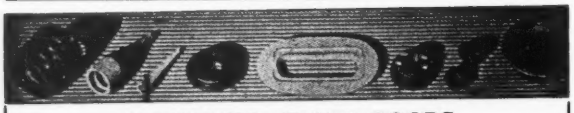

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Neat Trick?
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If you have reached both the financial and administrative limits of your present position and are capable as Chief Compounder of directing all of the compounding activities for molded and rubber to metal parts of an AAA-1 Company, we suggest you immediately forward a detailed outline of your experience and qualifications. Your capabilities are of greater importance to us than your salary requirement. The members of our organization know of this advertisement.

REPLY BOX NO. 1112, c/o INDIA RUBBER WORLD

FOREMAN EXPERIENCED IN SPONGE RUBBER PRODUCTION. Responsible position with well-established medium sized company in Midwest. Give personal history, education, and experience—also salary. Replies held confidential. Address Box No. 1101, care of INDIA RUBBER WORLD.

ENGINEER TO ASSIST MANAGER OF QUALITY CONTROL department of large diversified manufacturing company. Some experience in statistical quality control work, manufacturing and finished product specifications, sales coordination required. Chemical education preferred. Write full details of past experience, personal data, and salary required. All replies will be held in strictest confidence. Address Box No. 1102, care of INDIA RUBBER WORLD.

CHEMIST FOR RESEARCH AND DEVELOPMENT WORK ON solvent and latex adhesives with a growing California company. State age, experience, present salary, marital status in first reply. Address Box No. 1103, care of INDIA RUBBER WORLD.

CHEMIST EXPERIENCED IN SPONGE RUBBER RESEARCH and production, responsible position with well-established medium sized company in Midwest. Give personal history, education, and experience—also salary. Replies held confidential. Address Box No. 1104, care of INDIA RUBBER WORLD.

QUALITY CONTROL SUPERVISOR TO TAKE CHARGE OF RAW material, quality control and inspection operations in molded packing plant of large manufacturer. Chemical education preferred with at least two years' experience. Write giving full details of past experience, personal data, and salary required. All replies will be held in strictest confidence. Address Box No. 1105, care of INDIA RUBBER WORLD.

FACTORY MANAGER—VINYL PLASTIC FLOORING. NAtionally famous manufacturer has opening for factory manager or assistant. Excellent opportunity for advancement with a company that enjoys a top reputation in the floor-covering field. The man we seek must be thoroughly familiar with all phases of manufacturing vinyl plastic flooring. Experience with rubber flooring manufacturing helpful, but not essential. Write, giving full details of past experience, personal data, and salary desired. All replies will be held in strictest confidence. Address Box No. 1106, care of INDIA RUBBER WORLD.

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CHEMIST—RESEARCH AND DEVELOPMENT WORK, EXPERIence with phenolic and other resins, natural and synthetic rubbers, and adhesive compounding. Ability of independent thinking. Location, Northern New Jersey. Submit complete résumé and salary required. Address Box No. 1107, care of INDIA RUBBER WORLD.

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WANTED: THOROUGHLY EXPERIENCED MAN TO TAKE charge of spreader room. Must have experience in coating biased fabrics for rubber life rafts. Write giving experience. Reply will be held in strict confidence. Address Box No. 1114, care of INDIA RUBBER WORLD.

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A manufacturer of titanium dioxide is seeking the services of a man with a technical education, approximately 30 years of age, who is interested in selling and who has had some practical experience and background in rubber, as sales representative in the New England area. A real opportunity with an excellent chance for advancement in a nationally known company. Please write, stating age, education, job experience, and salary required.

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To get this top spot, he must have a thorough knowledge of foam rubber chemistry (including dispersion, formulation, etc.), plant engineering and set-up, and latest continuous-line manufacturing equipment including the Oakes mixer.

A solid *present* with this highly successful manufacturer located in the East awaits this man whose background and ability merits liberal salary.

Your reply in full held in strict confidence.

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MARKET REVIEWS

RUBBER

THE natural rubber market was relatively quiet during the period from June 16 to July 15. Demand was dull in view of consumer plant shutdowns for vacations and the growing effect of the steel strike. Prices fell irregularly through most of the period, then recovered somewhat as buyers began to build up stocks in preparation for plant post-vacation openings.

On July 1 the government stepped out of its selling role in the natural rubber market, and a free spot market was reestablished for the first time since March, 1951. No. 1 ribbed smoked sheets, which had been sold by the government for 38¢ a pound, dropped to 32.25¢, as the free market began operations, and declined irregularly to 31.50¢ on July 15. Closing spot market prices for other natural rubber grades on July 1 and 15 were as follows: No. 2 R.S.S., 31.25 and 30.75¢; No. 3 R.S.S. 30.25 and 29.75¢; No. 1 thick latex crepe, 41.75 and 41.50¢; No. 1 thin latex crepe, 40.25 and 41.00¢; No. 3 amber blankets, 25.75 and 25.25¢; No. 3 thin brown crepe, 23.50 and 22.50¢; and flat bark, 18.75¢ on both days.

COMMODITY EXCHANGE
WEEK-END CLOSING PRICES

Futures	Apr. 26	May 31	June 21	June 28	July 5	July 12
Sept.....	34.75	26.70	30.50	31.90	30.60	29.85
Dec.....	33.50	25.70	29.00	29.85	28.31	28.00
Mar.....	32.60	25.00	27.95	28.35	27.10	27.00
May.....	32.00	24.75	27.45	27.75	26.30	26.40
July.....	....	24.10	26.70	27.15	25.75	26.00
Total weekly sales, tons	3,250	5,050	5,590	4,630	2,760	2,880

Futures sales on the Exchange during the second half of June amounted to 10,930 tons, making a total for the month of 20,710 tons. Market dullness during the first half of July was reflected in the sales volume of 5,770 tons.

Latex

THE latex market was dull during the period from June 16 to July 15. In addition to the normal summer slowdown caused by vacation shutdowns, the steel strike with its resultant curtailment of automotive production also had a marked effect on latex demand for cushioning. Supplies of *Hevea* latex on hand are said to be ample for present and immediate future requirements.

The initial confusion after the reestablishment of a free market in *Hevea* latex on June 10 has now died away, and prices are relatively steady in the range of 38-42¢ a pound dry solids. Observers look for a downward trend in prices in view of the slow demand, ample supplies, and the entry into the market of new suppliers who are furnishing keen competitition to the older importers and distributors.

Importers of *Hevea* latex during April totaled 4,821 long tons, dry weight; consumption, 4,074 long tons; and month-end stocks, 6,983 long tons. Preliminary figures for May show imports of 3,409 long tons, dry weight; consumption, 3,986 long tons; month-end stocks, 9,445 long tons.

GR-S latex production in April amounted to 3,194 long tons, dry weight; imports, 191 long tons; consumption, 3,503 long tons; and month-end stocks, 3,029 long tons. Estimates for May are: production, 3,619 long tons, dry weight; imports, 227 long tons; consumption, 3,344 long tons; and month-end stocks, 3,826 long tons.

Neoprene latex production in April totaled 624 long tons, dry weight; consumption, 566 long tons; and month-end stocks, 1,199 long tons. Preliminary May figures are: production, 550 long tons, dry weight; consumption, 587 long tons; and month-end stocks, 1,096 long tons. April statistics for nitrile rubber latex show a production of 267 long tons, dry weight; consumption, 254 long tons; and month-end stocks, 479 long tons. May estimates are: production, 386 long tons, dry weight; consumption, 237 long tons; and month-end stocks, 499 long tons.

RECLAIMED RUBBER

THE reclaimed rubber market was quiet during the period from June 16 to July 15 as mills began shutting down for the annual vacation and inventory-taking period. The reclaim outlook for the next few months, at least, is pessimistic in view of authoritative estimates that consumption of crude and synthetic rubbers, excluding reclaim, will be less than available supplies this year. The possibility of a further drop in the RFC selling price for synthetic rubber also served to depress the market. On the constructive side, reclaimers are said to be actively carrying on development work on combinations of neoprene and first-quality whole tire reclaim for use in tire compounds.

Final April and preliminary May statistics on the domestic reclaimed rubber industry are now available. Final April figures are as follows: production, 23,948 long tons; imports, 86 long tons; consumption, 23,911 long tons; exports, 1,070 long tons; and month-end stocks, 39,767 long tons. Preliminary May figures are: production, 23,175 long tons; consumption 22,271 long tons; exports, 1,062 long tons; and month-end stocks, 41,325 long tons.

SCRAP RUBBER

PREPARATIONS by reclaiming mills for their annual closing for vacation periods and inventory-taking slowed the scrap rubber market down to a standstill during the period from June 16 to July 15. Most of the reclaiming mill shutdowns are in July; so a reactivation of scrap trading cannot be expected until August. In view of the market dullness, scrap dealers emphasized that prices were strictly nominal and not to be considered as the basis for actual trading.

The Office of Price Stabilization authorized wholesale rubber dealers to buy mixed lots of used tires and tubes from United States Government agencies without regard to ceiling price limitations. The authorization was provided in Amendment 3 to Ceiling Price Regulation 59, effective July 8. The effect of the ruling is to permit wholesale rubber dealers to bid for lots of scrap rubber containing reusable and recappable tires with the same opportunity as local scrap collectors, who never were limited by OPS on the amount they could offer to pay for such lots.

Following are dealers' selling prices for scrap rubber in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires.....	$9.00	$12.50/$13.00
S. A. G. auto tires.....	Nom.	Nom.
Truck tires.....	Nom.	12.00/ 13.00
Peelings, No. 1.....	Nom.	42.50/ 45.50
2.....	Nom.	23.00
3.....	Nom.	20.00
	(¢ per Lb.)	
Auto tubes, mixed.....	2.50/ 2.75	2.75
Black.....	3.00	3.75
Red.....	6.75	6.75/ 7.00
Butyl.....	1.75/ 2.00	1.75/ 2.00

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	Apr. 26	May 24	June 21	June 28	July 5	July 12
Oct.....	36.96	36.26	37.62	36.96	36.95	36.62
Dec.....	36.65	36.04	37.43	36.76	36.73	36.40
Mar.....	36.50	35.90	37.28	36.62	36.57	36.24
May.....	36.34	35.77	37.10	36.43	36.38	36.10
July.....	35.93	35.39	36.66	36.08	35.95	35.77
Oct.....	....	33.99	35.01	34.56	34.42	34.27

COTTON future prices showed an irregular decline on the New York Cotton Exchange during the period from June 16 to July 15. Active liquidation was noted in old crop July, but trading in new crop futures was on the cautious side. The United States Department of Agriculture's official crop estimate, issued on July 8, of 26,951,000 acres was smaller than generally expected. Based on last year's yield per acre, it was calculated that the estimated acreage could furnish a crop of about 14,500,000 pounds, as compared with 15,200,000 pounds in 1951. In view of favorable conditions throughout the cotton growing belt, observers were of the opinion that an above-average yield can be expected and give a crop output that would exceed prospective domestic and export requirements for the 1952-1953 season.

The spot price for 15/16-inch middling cotton started the period at 41.80¢, rose to a high of 42.15¢ on June 20 as the result of a flurry of mill orders, and then declined irregularly to a low of 40.05¢ on July 15. October futures started at 37.53¢ on June 16, rose to a high of 37.68¢ on June 19, fell to a low of 36.46¢ on July 14, and closed the period at 36.77¢.

Fabrics

Despite a better market tone, trading in wide industrial fabrics was slow during the period from June 16 to July 15 by a

CLASSIFIED ADVERTISEMENTS

Continued

SITUATIONS OPEN (Continued)

PRODUCTION MANAGER FOR LATEX DIPPING PLANT IN East. Please state experience in first letter. An excellent opportunity for ambitious man willing and able to take responsibility. Address Box No. 1115, care of INDIA RUBBER WORLD.

PRODUCTION SUPERINTENDENT—FOR RUBBER PLANT EMploying approximately 500 people. Manufacturers of dipped and cast latex products mainly for syndicate stores. Company rapidly expanding. Good production background more important than specialized training in rubber. Excellent opportunity for right man. Write, giving full particulars, to Box No. 1116, care of INDIA RUBBER WORLD.

ENGINEERS—Design, Process, and Project. Experience in paper converting, calendering, building materials, textiles, or automatic machinery. PABCO PRODUCTS INC., Emeryville 8, California. (Bay Area).

SITUATIONS WANTED

LATEX TECHNOLOGIST—CHEMICAL ENGINEER OFFERS HIS experience in the production of latex articles. Well qualified in all phases of development and manufacture. Specialties include adhesives, coatings, wire and cable, thread, dipping, rug backing, and others. Particularly interested in sponge, paper and latex base paints. Proven record of achievements. Numerous patents. Location immaterial. Address Box No. 1097, care of INDIA RUBBER WORLD.

OPERATIONS MANAGER, RESEARCH AND PRODUCT DEvelopment engineer, chemist, with 30 years' experience in application plastics, rubber, latex, fabric coating and allied fields. Diversified chemical, mechanical, and consulting experience. Patents registered. Available short notice. Address Box No. 1098, care of INDIA RUBBER WORLD.

CHEMIST AND EXECUTIVE, EXPERT IN ADHESIVES, CAN take charge of production, research, development, sales engineering. Address Box No. 1099, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER, CAPABLE, PRODUCTIVE, AGGRESSIVE organizer; nine years' development quality seals, varied specialties, tires; desires rubber, related production, service; immediate interview. Address Box No. 1117, care of INDIA RUBBER WORLD.

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FOR SALE: 1—22" X 60" 2-ROLL COMPOUNDING MILL, 150 H P synchronous motor; 1—2" oil-heated Extruder, motor driven; 1—Colton #5½ Preform Machine, motor driven. Also Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters. Send us your inquiries. Also your list of Idle Equipment. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 38, N. Y. BArclay 7-0600.

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BALDWIN-SOUTHWARK PRESS. 250-TON BALDWIN-SOUTHwark 2-opening hydraulic press with 24" platens, 19" cylinder, and 10" stroke. Complete with Burnham Simplex steam pump. FARLEY & LOETSCHER MFG. CO., Dubuque, Iowa.

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FOR SALE: 1—BALL & JEWELL NO. 1½ ROTARY CUTTER, stainless steel. 2—Mikro pulverizers No. 2-TH and No. 2-SI. 2 Kux rotary pelllet presses. 6—Stokes rotary pellet presses. Read 600-gal. jacketed ribbon mixer. Large stock stainless steel tanks and kettles. PERRY EQUIPMENT CORP., 1424 N. 6th St., Philadelphia 22, Pa.

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22 x 72"
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18 x 45" (several)
18 x 30"
16 x 40" (several)
16 x 30"
16 x 24"
6 x 12" (used lab)
6 x 12" (new lab)
8 x 18"
10 x 24"

CALENDERS

24 x 66" 3-roll
22 x 60" 3-roll
18 x 54" 3-roll
16 x 40" 3-roll
12 x 30" 4-roll
10 x 20" 3-roll
6 x 12" New lab

HYDRAULIC PRESSES

24 x 24", 12" ram
24 x 24", 14" ram
30 x 30", 16" ram
48 x 48", 4-14" rams, 8 openings
12 x 12"

We also furnish new ARMACO presses of the following sizes:

12 x 12" 36 x36"
18 x 18" 42 x 42"
24 x 24" 48 x 48"
32 x 32"

Also larger sizes, all presses having large diameter rams.

EXTRUDERS

1", 2", 3¼", 4½", 6", 8", 12" all with motors and drives

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Refiners, Crackers, Choppers, and Grinders
Black Rock Washer Cutters
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UNITED RUBBER MACHINERY EXCHANGE

183-189 ORATON ST. CABLE "URME" NEWARK 4, N. J.

combination of the steel strike and mill vacation shutdowns. The effects of the steel strike are beginning to tell in sales of heavy beltings, canvas, and wide goods, but observers believe that a settlement of the strike will bring widespread market activity. Traders point to the strong price structure of most industrial goods as evidence that the market is being set back only temporarily. Meanwhile a steady, though not heavy volume of business is going on in sateens, broken twills, drills, chafers, and wide sheetings.

Cotton Fabrics

Drills

59-inch 1.85-yd.	*yd.*	$0.37	$0.375
2.25-yd.		.32	

Ducks

38-inch 1.78-yd S. F.	*yd.*	nom.	
2.00-yd. D. F.		nom.	
51.5-inch, 1.35-yd. S. F.		nom.	
Hose and belting		.76	

Osnaburgs

40-inch 2.11-yd.	*yd.*	nom.	
3.65-yd.		.155 /	.1575

Raincoat Fabrics

Print cloth, 38½-inch, 64-60	*yd.*	.1525/	
Sheeting, 48-inch, 4.17-yd		.22	
52-inch 3.85-yd		.23⅞	

Chafer Fabrics

14-oz./sq. yd. Pl.	*lb.*	.83	
11.65-oz./sq. yd. S.		.74	
10.80-oz./sq. yd. S.		.76 /	.78
8.9-oz./sq. yd. S.		.795	

Other Fabrics

Headlining, 68-inch 1.35-yd., 2-ply	*yd.*	nom.	
68-inch, 1.25-yd. 2-ply		.67	
Sateens, 53-inch 1.32-yd		.60 /	.61
58-inch 1.21-yd		.66	

Tire Cords

K. P. std., 12-4-2	*lb.*	5.8	

RAYON

TOTAL shipments of all types of rayon by domestic producers during June reached 103,300,000 pounds, an increase of 12% over those of the preceding month. Of this total, 102,200,000 pounds were shipped to domestic consumers. Overall domestic rayon production during June totaled 89,300,000 pounds, as compared with 82,000,000 pounds in May. Production of viscose high-tenacity yarn amounted to 36,400,000 pounds in June, an increase of 600,000 pounds over the May total. June shipments of high-tenacity yarn totaled 35,200,000 pounds, a decline of 800,000 pounds from those of the preceding month, and end-of-month stocks held by producers were 4,100,000 pounds, an increase of 1,200,000 pounds over the May figure.

First-quarter 1952 tire cord and fabric production figures are now available. Tire cord production follows: cotton, 48,000,000 pounds; rayon, 87,000,000 pounds; nylon, 1,000,000 pounds; total, 136,000,000 pounds. Cotton chafer fabric production amounted to 13,000,000 pounds, giving a total tire cord and fabric production figure for the quarter of 149,000,000 pounds, 6,000,000 pounds under the figure for the fourth quarter of 1951.

No changes in rayon tire fabric and yarn prices were made during the period from June 16 to July 15, and current prices follow:

Tire Yarns

1100/ 480	$0.63
1100/ 490	.62
1150/ 490	.62
1650/ 720	.62
1650/ 980	.61
1900/ 980	.61
2200/ 960	.61
2200/ 980	.60
4400/2934	.63

Tire Fabrics

1100/490/2		$0.72
1650/980/2	$0.659 /	.73
2200/980/2		.685

Financial

(*Continued from page 688*)

Russell Mfg. Co., Middletown, Conn. Twenty-four weeks to May 17, 1952: net income, $80,593,, against $282,595 a year earlier.

Sun Oil Co., Philadelphia, Pa. Half ended June 30, 1952: net earnings, $21,413,293, equal to $3.23 a share, against $22,712,149, or $3.77 a share, in the corresponding period last year.

Thiokol Corp., Trenton, N. J. Initial half, 1952: net profit, $117,826, equal to 36¢ a common share compared with $58,274, or 19¢ a share, in the first half last year.

U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y. Twenty-four weeks to June 15, 1952: net income, $100,943, against $257,111 in the corresponding period last year.

Union Carbide & Carbon Corp., New York, N. Y. First six months, 1952: net earnings, $46,440,458, equal to $1.61 a common share, against $58,227,904, or $2.02 a share, in the corresponding months of 1951.

United States Rubber Co., New York, N. Y. Half to June 30, 1952: net profit, $12,956,461, equal to $1.95 a common share, compared with $16,427,189, or $2.62 a share, in the 1951 period; net sales, $443,491,316, against $427,714,511.

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory, May, April, 1952; May, 1951

	May, 1952	% of Change from Preceding Month	April, 1952	First Five Months, 1952	First Five Months, 1951
Passenger Casings					
Shipments					
Original equipment	2,223,976		2,314,404	9,996,206	12,729,441
Replacement	3,996,136		3,466,062	16,873,400	13,626,716
Export	32,366		45,882	235,841	244,292
TOTAL	6,252,478	+ 7.31	5,826,348	27,105,447	26,600,449
Production	6,069,190	+ 4.16	5,826,702	30,496,026	26,078,039
Inventory end of month	10,388,646	− 1.85	10,584,603	10,388,646	2,056,908
Truck and Bus Casings					
Shipments					
Original equipment	494,582		499,187	2,445,143	2,380,382
Replacement	627,752		572,224	3,275,380	3,973,371
Export	68,336		68,891	429,032	316,989
TOTAL	1,190,670	+ 4.42	1,140,302	6,149,555	6,670,742
Production	1,364,239	+ 0.12	1,362,575	7,247,584	6,862,937
Inventory end of month	2,874,752	+ 6.05	2,710,788	2,874,752	935,459
Total Automotive Casings					
Shipments					
Original equipment	2,718,558		2,813,591	12,441,349	15,109,823
Replacement	4,623,888		4,038,286	20,148,780	17,600,087
Export	100,702		114,773	664,873	561,281
TOTAL	7,443,148	+ 6.84	6,966,650	33,255,002	33,271,191
Production	7,433,429	+ 3.40	7,189,277	37,743,610	32,940,976
Inventory end of month	13,263,398	− 0.24	13,295,391	13,263,398	2,992,367
Passenger Including Motorcycle and Truck and Bus Tubes					
Shipments					
Original equipment	2,718,339		2,812,644	12,443,340	15,120,991
Replacement	2,548,499		2,409,540	13,206,738	14,771,929
Export	63,469		83,234	460,617	338,723
TOTAL	5,330,307	+ 0.47	5,305,418	26,110,695	30,231,643
Production	5,770,673	+ 5.28	5,481,364	27,469,076	27,929,587
Inventory end of month	11,492,670	+ 4.86	11,012,722	11,492,670	5,086,647

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

Foreign Trade Opportunities

The firms and industries listed below recently expressed their interests in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

Cie. Commerciale de Matierps Premieres, S. A., 1 Meir, Antwerp, Belgium: synthetic rubber, carbon black.

Empresas Ultramar C. por A., Isabel la Catolica 66, Ciudad Trujillo, Dominican Republic: automotive spare parts and accessories.

Ahmad A. Ghaissarieh, Saadi Ave., Tehran, Iran: tires and tubes.

Import Opportunities

Ahmad A. Ghaissarieh, Saadi Ave., Tehran, Iran: gum tragacanth, sulfur.

Michael Schreiber, Gummiwarenfabrik, 4 Koelner Tor, Dusseldorf-Gerresheim, Germany: latex threads and bands for materials, clothing, and hosiery.

Friedrich Schwenkner, Rinteln-Moellenbeck, Germany: non-inflammable, waterproof, and acid-proof wearing apparel for professional and handicraft trades.

Gummiwerk Pass & Sohn, 43 Hattingerstrasse, Schwelm/W., Germany: industrial rubber goods.

MACHINERY AND SUPPLES FOR SALE (Continued)

FOR SALE: NEW LABORATORY MILLS AND CALENDERS; also used Banbury Mixers, Mills, Calenders, Extruders, Tubers, Hydraulic Presses, Vulcanizers. Send us your inquiries. EAGLE INDUSTRIES, INC., 112 Washington Street, New York 6, N. Y. DIgby 4-8364.

FOR SALE: FARREL 16" X 48" AND 15" X 36", 2-ROLL RUBBER mills, also new lab. 6" x 12" & 6" x 16" mixing mills and calenders, & other sizes up to 84". Extruders 1" to 3". Proctor & Schwartz 6-fan, 3-apron conveyor-dryer. Baker-Perkins mixers 100, 50, and 9 gals. heavy-duty double-arm. Ball & Jewell & Leominster rotary cutters. Large stock hydraulic presses from 12" x 12" to 48" x 48" platens from 50 to 1,500 tons. Hydraulic pumps and accumulators. Crushers, churns, rubber bale cutters, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 90 WEST STREET, NEW YORK 6, N. Y.

MACHINERY AND SUPPLIES WANTED

WANTED — TO EXPEDITE PRODUCTION — RUBBER MAKING machinery including Banbury Mixers, Heavy-Duty Mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a set-up plant now operating or shut down. When offering, give full particulars. P. O. Box 1351, Church Street Sta., New York 8, N. Y.

WANTED TO PURCHASE: INDIA RUBBER WORLD FROM Volume 1 through 78 (1889-Sept., 1928), or parts. MAPLETON HOUSE, 5415 17th Ave., Brooklyn 4, New York.

ONE STEAMHEATED PRESS—PLATENS 30" X 30" WITH A 14" ram and 24" of daylight. ASSOCIATED RUBBER, INC., Box 61, Quakertown, Pa.

LATE MODEL TUBER, HERRINGBONE OR WORM GEAR DRIVE, size 3½" or 4½". Call RADIATOR SPECIALTY CO., Charlotte, N. C., collect.

WE ARE INTERESTED IN PURCHASING ALL TYPES OF RUBber machinery consisting of mills, Banbury mixers, extruders, calenders, vulcanizers, etc., and also complete plants. Address Box No. 1109, care of INDIA RUBBER WORLD.

WANTED—NEW OR USED HEAVY DUTY DOUGH MIXER, 100-gal. capacity for use with 100 h.p. motor. Must be suitable for rubber dispersion. Similar to B. P. Mixer #15-VUMM. Address Box No. 1110, care of INDIA RUBBER WORLD.

SMALL VULCANIZER 12" TO 18" DIAMETER BY APPROXImately 2 feet long. Tested for 40 lbs. operating pressure. ASSOCIATED RUBBER, INC., Quakertown, Pa.

WANTED: 1—60" Rubber Mill, complete, and 1—3A Banbury, complete, good condition. Required for plastics manufacturing plant. No dealers. Address Box No. 1111, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

DISTRIBUTOR ESTABLISHED 60 YEARS, SELLING SHOE manufacturers and now seeks rubber sole slab account. Will handle commission or purchase. Address Box No. 1108, care of INDIA RUBBER WORLD.

OFFERS ARE INVITED FOR A COMPACT RUBBER ESTATE in Perak of 813 planted acres. For further particulars apply MESSRS. MACLEAN, BRODIE & FORGIE, C.A., 7 Royal Bank Place, Glasgow, C. 1, Scotland.

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Cancelled — Unshipped — Rejected or Over-stocked

CHEMICALS — PIGMENTS — SOLVENTS

PLASTICIZERS — COLORS — OILS — WAXES, etc.

CHEMICAL SERVICE CORPORATION

80 Beaver St., New York 5, N. Y. HAnover 2-6970

WANTED TO BUY

SMALL RUBBER FACTORY

Prefer it located in small mid-western town. Must be equipped to make molded parts and tubing. State fully regarding equipment and buildings. It is wanted by an expanding 50-year-old concern.

ADDRESS BOX NO. 1113, % INDIA RUBBER WORLD

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THE LANGUAGE OF THE RUBBER INDUSTRY SINCE 1915

DUROMETER

VARIOUS MODELS FOR TESTING THE ENTIRE RANGE

TECHNICAL DATA ON REQUEST

THE SHORE INSTRUMENT & MFG. CO., INC.

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JAMAICA 2, N. Y.

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881 State St., New Haven, Conn. Phone 7-5662
Otto J. Lang, General Mgr.

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We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one or more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.
Address all replies "confidentially" C. J. GALE, Sec., 233 Broadway, New York 7, N. Y. BArclay 7-1819.

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We do milling and compounding of all types — blacks or colors — Master Batches —
All mixing done under careful supervision and laboratory control.

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Phone: Butler 9-0400 BUTLER, NEW JERSEY

EXPERT MIXING AND CALENDERING

Rubber and GRS mixing and plastic compounding and calendering. All work done under careful supervision. Also precision grinding and pulverizing.

QUICK SERVICE

The Elm City Rubber Co.

73 Wallace Street, New Haven, Conn.
P. O. Box 1864 Telephone 8-6152

HELP WANTED in reducing tear, increasing building tack in GR-S? Recent advances in compounding with Purecal (Wyandotte's precipitated calcium carbonate, whitest extender known) warrant cost comparison with cheapest natural rubber formulas. For samples, data, and consultations write us. Wyandotte Chemicals Corporation, Calcium Carbonate Sales Dept., Wyandotte, Michigan.

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	March, 1952 Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	182,732,597	$76,567,896
Latex	7,997,570	4,149,537
Guayule	56,000	12,701
Balata	111,797	43,207
Crude chicle	736,233	496,606
Jelutong or Pontianak	287,575	217,096
Gutta percha	60,473	43,861
Synthetic rubber	3,334,429	782,253
Reclaimed rubber	56,000	2,100
Scrap rubber	1,257,405	43,902
TOTALS	196,630,079	$82,359,159
MANUFACTURED		
Rubber tires		
Auto, etc. *no.*	37,502	$1,284,696
Bicycle *no.*	4,021	5,526
Other *no.*	51	261
Inner tubes: auto, etc. *no.*	333	1,218
Footwear		
Boots *prs.*	2,834	5,851
Shoes and overshoes *prs.*	7,590	5,032
Rubber-soled canvas shoes *prs.*	8,380	9,702
Athletic balls		
Golf *no.*	60,842	18,339
Tennis *no.*	62,580	17,518
Other *no.*	79,336	12,855
Toys	.....	30,947
Hard rubber goods		
Combs *no.*	10,512	1,707
Other sundries	.....	446
Other	.....	59,000
Rubberized printing blankets *lbs.*	1,477	3,177
Rubber and cotton packing *lbs.*	4,987	10,644
Gaskets and valve packing	.....	9,220
Belting *lbs.*	8,537	13,455
Hose and tubing	.....	1,858
Drug sundry sets *prs.*	38,090	9,758
Nipples and pacifiers *gr.*	1,625	2,083
Instruments *doz.*	854	5,785
Other rubber products	.....	105
Gutta percha manufactures *lbs.*	13,105	12,336
Rubber bands *lbs.*	1,906	2,062
Synthetic rubber products	.....	218
Other soft rubber goods	.....	130,434
TOTALS	.....	$1,654,233
GRAND TOTALS, ALL RUBBER IMPORTS	.....	$84,013,392

Exports of Domestic Merchandise

	March, 1952 Quantity	Value
UNMANUFACTURED, Lbs.		
Chicle and chewing gum bases	451,703	$197,951
Balata, gutta percha, etc.	500	1,410
Synthetic rubbers GR-S type	6,243,535	1,652,000
Neoprene	1,154,738	466,045
Nitrile type	414,778	210,371
Other	4,861	4,412
Reclaimed rubber	2,360,267	218,085
Scrap rubber	1,932,588	76,531
TOTALS	12,562,970	$2,826,805
MANUFACTURED		
Rubber cement *gals.*	72,746	$126,576
And rubberized fabric *sq. yds.*	140,014	142,122
Clothing	.....	275,879
Footwear		
Boots and shoes *prs.*	42,499	77,097
Rubber soled canvas shoes *prs.*	15,551	28,592
Heels *doz. prs.*	49,234	58,944
Soling and toplift sheets *lbs.*	589,421	169,762
Gloves and mittens *doz. prs.*	17,494	83,526
Drug sundries	.....	232,269
Toys, balls, novelties, etc.	.....	62,243
Hard rubber goods		
Battery boxes *no.*	29,117	48,980
Other electrical *lbs.*	116,515	91,921
Other	.....	45,063
Rubber tires and casings		
Truck and bus *no.*	127,200	6,534,203
Auto and motorcycle *no.*	53,465	768,277
Aircraft *no.*	3,209	124,315
Off-the-road *no.*	15,964	2,054,467
Farm tractor *no.*	7,490	344,862
Farm implement *no.*	1,413	38,736
Other *no.*	16,368	88,825
Inner tubes		
Auto *no.*	32,026	80,285
Truck and bus *no.*	73,414	348,657
Aircraft *no.*	1,451	13,638
Other *no.*	15,044	81,326
Solid tires		
Truck and industrial *no.*	1,991	41,723
Other *lbs.*	2,006	198
Tire repair materials		
Camelback *lbs.*	631,993	205,284
Other *lbs.*	709,717	638,239
Rubber tape, except medical and friction *lbs.*	54,429	39,680
Belting		
V-type fan belts *lbs.*	137,366	197,187
Transmission V-belts *lbs.*	158,346	356,966
Flat belts *lbs.*	39,677	70,950
Conveyor and levitator *lbs.*	127,427	141,914
Other *lbs.*	1,558	3,135
Hose		
Molded braided *lbs.*	473,158	441,545
Wrapped and hand built *lbs.*	127,719	132,910
Other hose and tubing *lbs.*	97,428	113,838
Packing		
Sheet type *lbs.*	76,854	52,608
Other *lbs.*	209,906	266,341
Tiling and flooring *lbs.*	139,507	36,499
Mats and matting *lbs.*	341,871	103,434
Thread: bare *lbs.*	7,432	13,723
Textile covered *lbs.*	11,467	32,733
Compounded rubber for further manufacture *lbs.*	1,030,578	380,489
Other rubber manufactures	.....	617,278
TOTALS	.....	$15,807,239
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$18,634,044

Reexports of Foreign Merchandise

	March, 1952 Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	207,369	$127,007
Balata, gutta percha, etc.	2,187	1,640
Synthetic rubber, GR-S	13,093	5,315
TOTALS	222,649	$133,962
MANUFACTURED		
Rubber soling and toplift sheets *lbs.*	781	$570
Gloves and mittens *doz. prs.*	60	192
Drug sundries	.....	337
Toys, balls, novelties, etc.	.....	1,105
Tires and casings		
Farm tractor *no.*	9	472
TOTALS	.....	$2,676
GRAND TOTALS, ALL RUBBER REEXPORTS	.....	$136,638

SOURCE: Bureau of the Census, United States Department of Commerce, Washington, D. C.

United States Rubber Statistics—April, 1952

	New Supply: Production	Imports	Total	Distribution: Consumption	Exports	Month-End Stocks
Natural rubber, total	0	78,098	78,098	32,290	85	54,631
Latex, total	0	4,821	4,821	4,074	0	6,983
Rubber and latex, total	0	82,919	82,919	36,364	85	61,614
Synthetic rubbers, total	*69,453 †7,004	1,320	77,777	67,592	2,404	158,522
GR-S types‡	*62,001 †27	1,173	63,201	55,690	1,518	126,180
Butyl	*7,452	147	7,599	6,032	1	20,208
Neoprene‡	†5,691	0	5,691	4,748	646	8,429
Nitrile types‡	†1,286	0	1,286	1,122	239	3,805
Natural rubber and latex, and synthetic rubbers, total	76,457	84,239	160,696	103,956	2,489	220,136
Reclaimed rubber, total	23,948	86	23,034	23,911	1,070	39,767
GRAND TOTALS	100,405	84,225	184,730	127,867	3,559	259,903

SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.
*Government plant production.
†Private plant production.
‡Includes latices.

Compounding Ingredients—Price Changes and Additions

Accelerators, Organic

A-32	*lb.*	$0.61	/ $0.68
Altax	*lb.*	.435	/ .46
Bismate	*lb.*	3.00	
Butasan	*lb.*	1.035	
Butyl Zimate	*lb.*	1.035	
Captax	*lb.*	.34	/ .36
DPG	*lb.*	.43	/ .505
El-Sixty	*lb.*	.465	/ .535
Ethasan	*lb.*	1.035	
Ethyl Tuads	*lb.*	1.035	
Zimate	*lb.*	1.035	
Ethylac	*lb.*	.91	/ .93
Merac	*lb.*	.75	/ 1.03
Mertax	*lb.*	.455	/ .525
Methasan	*lb.*	1.035	
Methyl Tuads	*lb.*	1.135	
Zimate	*lb.*	1.035	
Mono Thiurad	*lb.*	1.135	
Rotax	*lb.*	.455	/ .475
S. A. 52	*lb.*	1.135	
57, 62, 67, 77	*lb.*	1.035	
66	*lb.*	1.50	
Selenac	*lb.*	1.50	
Thiofide	*lb.*	.435	/ .505
Thiotax	*lb.*	.35	/ .42
Thiurad	*lb.*	1.135	
Unads	*lb.*	1.135	
Zetax	*lb.*	.445	/ .465

Plasticizers

Emersol 110	*lb.*	.115	/ .1275
120	*lb.*	.12	/ .1325
130	*lb.*	.1425	/ .155
210 Elaine	*lb.*	.1175	/ .1475
Emery 600	*lb.*	.095	/ .125
Hyfax 430	*lb.*	.14	/ .1525
431	*lb.*	.16	/ .1725

Antioxidants

AgeRite Alba	*lb.*	2.275	/ 2.375
Gel	*lb.*	.62	/ .64
HP	*lb.*	.695	/ .715
Hipar	*lb.*	.94	/ .96
Powder	*lb.*	.505	/ .525
Resin	*lb.*	.67	/ .69
D	*lb.*	.505	/ .525
Stalite	*lb.*	.505	/ .525
White	*lb.*	1.45	/ 1.55
Flectol H	*lb.*	.505	/ .575
Rio Resin	*lb.*	.54	/ .56
Santoflex 35	*lb.*	.695	/ .765
AW	*lb.*	.75	/ .82
B	*lb.*	.505	/ .575
BX	*lb.*	.62	/ .69
Santowhite Crystals	*lb.*	1.60	/ 1.67
L	*lb.*	.505	/ .575
MK	*lb.*	1.29	/ 1.36

Chemical Stabilizers

Vanstay HH	*lb.*	.98

Latex Compounding Ingredients

AgeRite dispersions	*lb.*	.75	/ 3.00
Ethyl Thriuad	*lb.*	1.035	
Pip-Pip	*lb.*	2.07	

Plasticizers

Baker AA Oil	*lb.*	.27	/ .33
Crystal O Oil	*lb.*	.285	/ .345
Processed oils	*lb.*	.29	/ .325

Retarders

Retarder ASA	*lb.*	.57

Vulcanizing Agents

Vultax #2	*lb.*	.47	/ .6025
3	*lb.*	.51	/ .655

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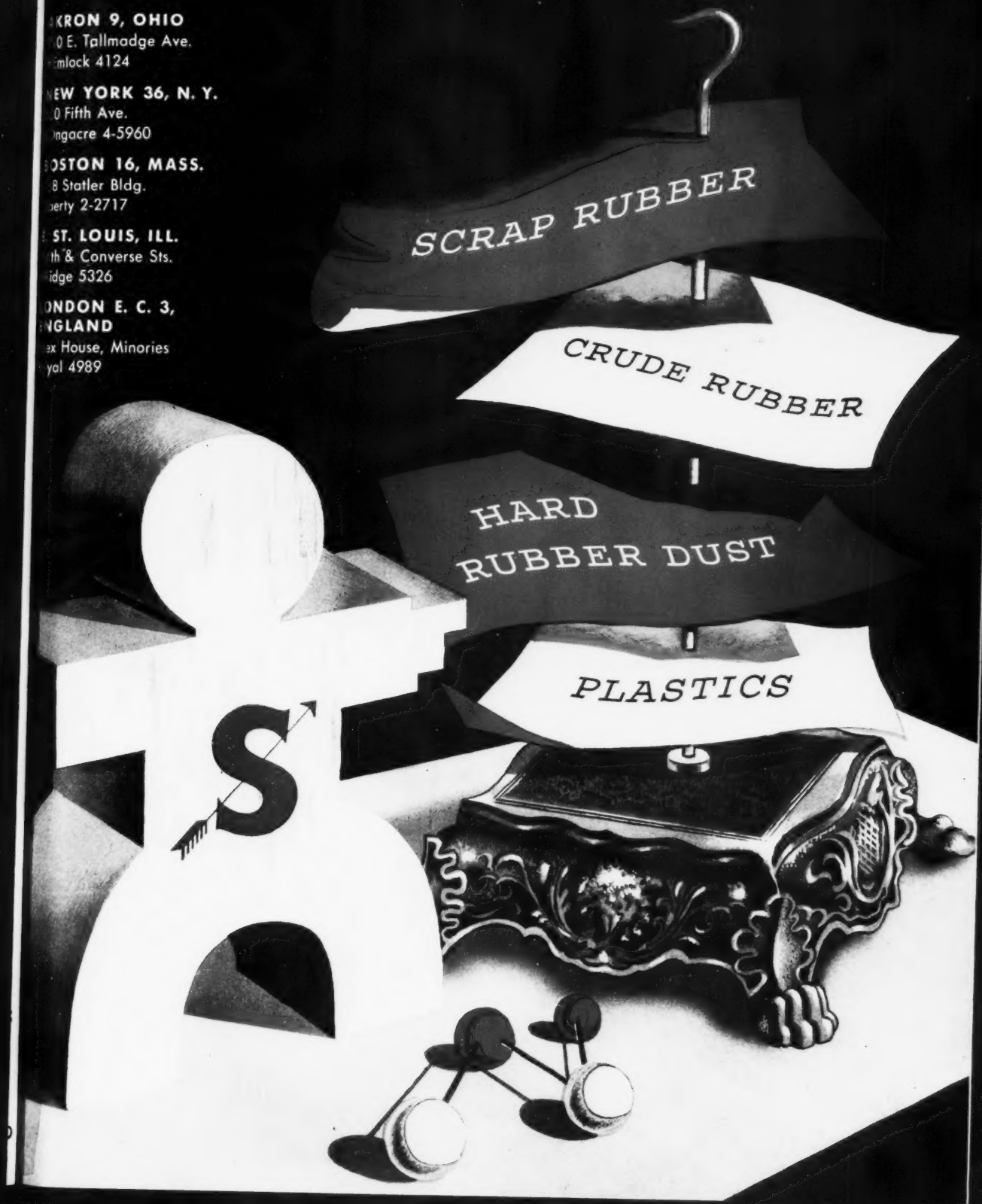

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